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# ANGIOLOGY



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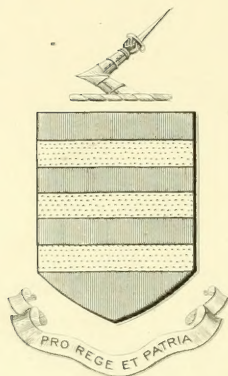
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AN ATLAS  
OF  
HUMAN ANATOMY  
FOR STUDENTS AND PHYSICIANS

BY  
CARL TOLDT, M.D.  
PROFESSOR OF ANATOMY IN THE UNIVERSITY OF VIENNA  
ASSISTED BY  
PROFESSOR ALOIS DALLA ROSA, M.D.

Translated from the Third German Edition and adapted to English and American and  
International Terminology

BY  
M. EDEN PAUL, M.D. BRUX., M.R.C.S., L.R.C.P.

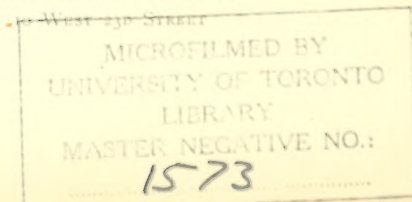
FIFTH SECTION  
F. ANGIOLOGY  
(FIGURES 933 TO 1123 AND INDEX)



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ANGIOLOGIA  
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## ANGEIOLOGY—GENERAL CONSIDERATIONS

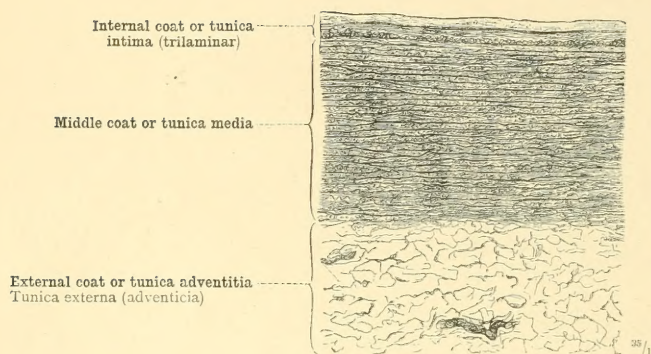


FIG. 933.—PART OF A TRANSVERSE SECTION THROUGH THE WALL OF THE DESCENDING THORACIC AORTA (HUMAN): INTERNAL, MIDDLE, AND EXTERNAL COATS; TUNICA INTIMA, MEDIA, ET EXTERNA.

In the external coat sections of two vasa vasorum are seen.

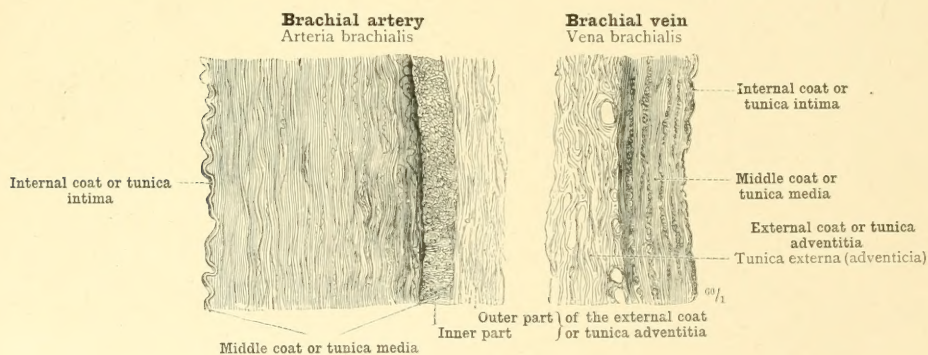


FIG. 934.—PART OF A TRANSVERSE SECTION THROUGH THE CUBITAL PORTION OF THE BRACHIAL ARTERY AND VEIN (HUMAN).

The Layers of the Walls of the Bloodvessels.



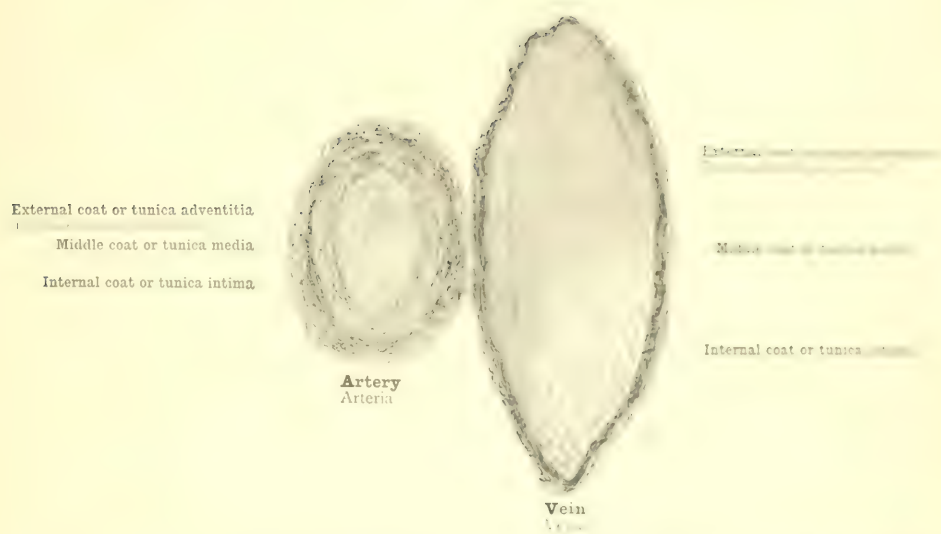


FIG. 935.—TRANSVERSE SECTION THROUGH AN ARTERY OF THE MESENTERY AND A VEIN (HUMAN).

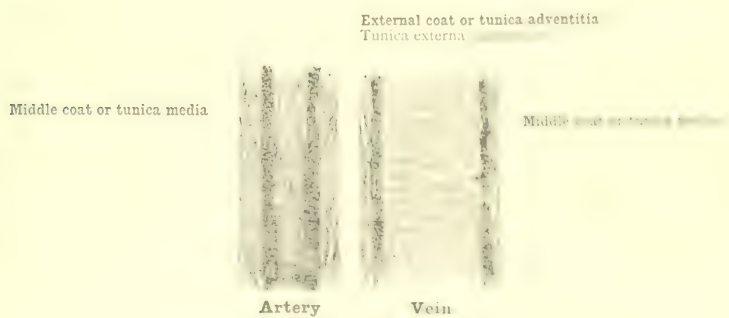


FIG. 936.—LONGITUDINAL SECTIONS OF A SHORT ARTERY AND A VEIN (HUMAN).

THE LAYERS OF THE WALLS OF THE BLOODVESSELS.



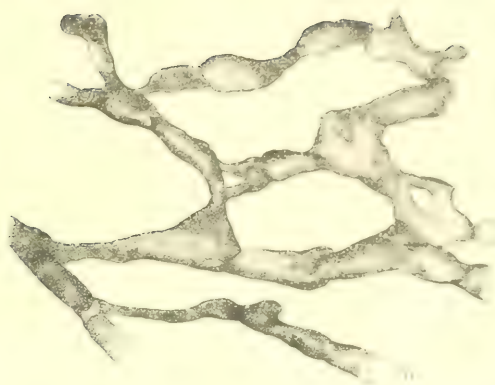


FIG. 939.—VALVED SUBCAPILLARY LYMPHATIC VESSEL (VASA LYMPHATICA) FROM THE SUBMUCOUS LYMPHATIC PLEXUS OF THE HUMAN OCULAR CONJUNCTIVA (GORGES AND BROWN), INJECTED WITH TRANSPARENT GELATIN.

Lymphatic  
capillaries  
  
Small lymphatic trunks

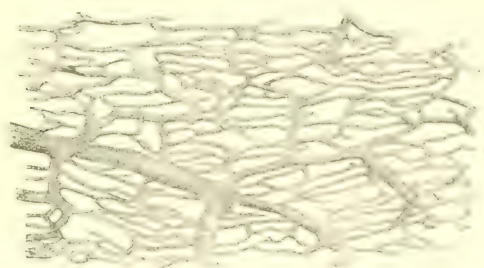


FIG. 940.—LYMPHATIC CAPILLARIES FROM THE MUCOSA OF THE STOMACH (THE VASA LYMPHATICA) INJECTED WITH OPAQUE YELLOW GELATIN.

The Capillary and Subcapillary Lymphatics (Vasa Lymphatica)





COR

THE HEART







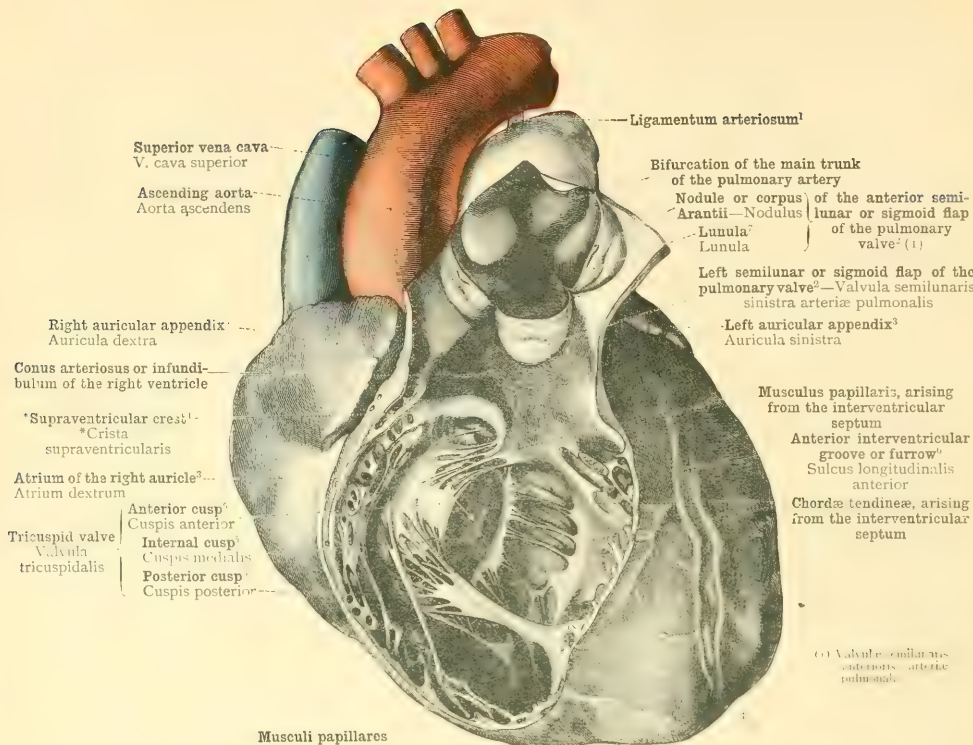


FIG. 946.—THE HEART SEEN FROM BEFORE.

The anterior wall of the right ventricle and of the conus arteriosus or infundibulum has been removed; the main trunk of the pulmonary artery, arteria pulmonalis, has been opened by an incision passing from a point between the anterior and the right semilunar or sigmoid flaps of the pulmonary valve<sup>2</sup> to the bifurcation, and the anterior wall of the artery has been turned to the left. In this manner the tricuspid valve, valvula tricuspidalis, with its papillary muscles, musculi papillares, and tendinous chords, chordae tendineae, and also the semilunar or sigmoid flaps of the pulmonary valve with their nodules, or corpora Arantii, and lunulae, have been brought into view. The heart had previously been hardened in the distended state (*i.e.*, in diastole) by immersion in chromic acid solution and alcohol.

<sup>1</sup> See Appendix, note <sup>11</sup>.

<sup>2</sup> *Point of the Aortic and Pulmonary Valves*.—These are differently designated by different authorities. 1. The *Pulmonary Valve*. According to Von Langer and Toldt, the flaps of this valve are *anterior, right, and left*; according to Quain, they are *anterior, right, and posterior*; and according to Macalister, they are (1) *anterior* and to the left, (2) *posterior* and to the right, and (3) *posterior* and to the left. 2. The *Aortic Valve*. According to Von Langer and Toldt, the flaps of this valve are *anterior, right, and left*; according to Quain, they are *anterior, right, and left*; and according to Macalister, they are (1) *anterior* and to the right, (2) *anterior* and to the left, and (3) *posterior* and to the left. The position of these flaps can be accurately determined only by the examination of frozen sections of the thorax. The seventh plate of Brannan's "Atlas of Topographical Anatomy" (English edition) gives an excellent view of these aortic and pulmonary valves, and if the arrangement there figured is a normal one, Quain's description is certainly to be preferred. In the text, however, I follow Toldt's nomenclature of the flaps. The

<sup>3</sup> See Appendix, note <sup>12</sup>.

<sup>4</sup> *Corpus Arantii*.—On the inner wall of the right ventricle, between the *anterior, right, and left* flaps of the pulmonary valve, there is an eminence that projects freely into the ventricular cavity; this is the *corpus Arantii*. Thus, whereas on the left side of the heart the mitral and aortic crifices are closely approximated one to the other, and are surrounded by a continuous fibrous tissue, on the right side of the heart the *anterior, right, and left* flaps are a little distant apart, and each is surrounded by a mass of muscular tissue. (Von Langer and Toldt, *op. cit.* p. 410. Quain, *op. cit.* p. 110. Macalister, *op. cit.* p. 110.) The *corpus Arantii* is a small, rounded, nodular structure, which corresponds to the beginning of the wall of the *anterior, right, and left* flaps of the pulmonary valve. Macalister (*op. cit.* p. 110) writes: "Between the auriculo-ventricular and the pulmonary openings is an area, the *corpus Arantii*, called by Macalister, *corpus Arantii*, and by Quain, *corpus Arantii*." (English edition, p. 110.)

<sup>5</sup> *Valvulae semilunares arteriae pulmonalis*.—The *corpus Arantii* of the valve are variously named by different authorities. *Corpus Arantii*, the *corpus Arantii* of Toldt, is called the *right flap* both by Quain and by Macalister; *cuspis posterior*, the *posterior cusp* of Toldt, is called *posterior* also by Macalister, and by Quain the *posterior or sigmoid flap*.—The

<sup>6</sup> *Lunula*.—The term denotes the thin, narrow portion at the free edge of the semilunar flap of the aortic and pulmonary valves. Toldt, *op. cit.* p. 410, describes one lunula in each flap, in the middle of which is the nodule or corpus Arantii; whereas English anatomists recognise two lunulae in each flap, separated from one another by the nodule.—The

Right ventricle—Ventriculus dexter.

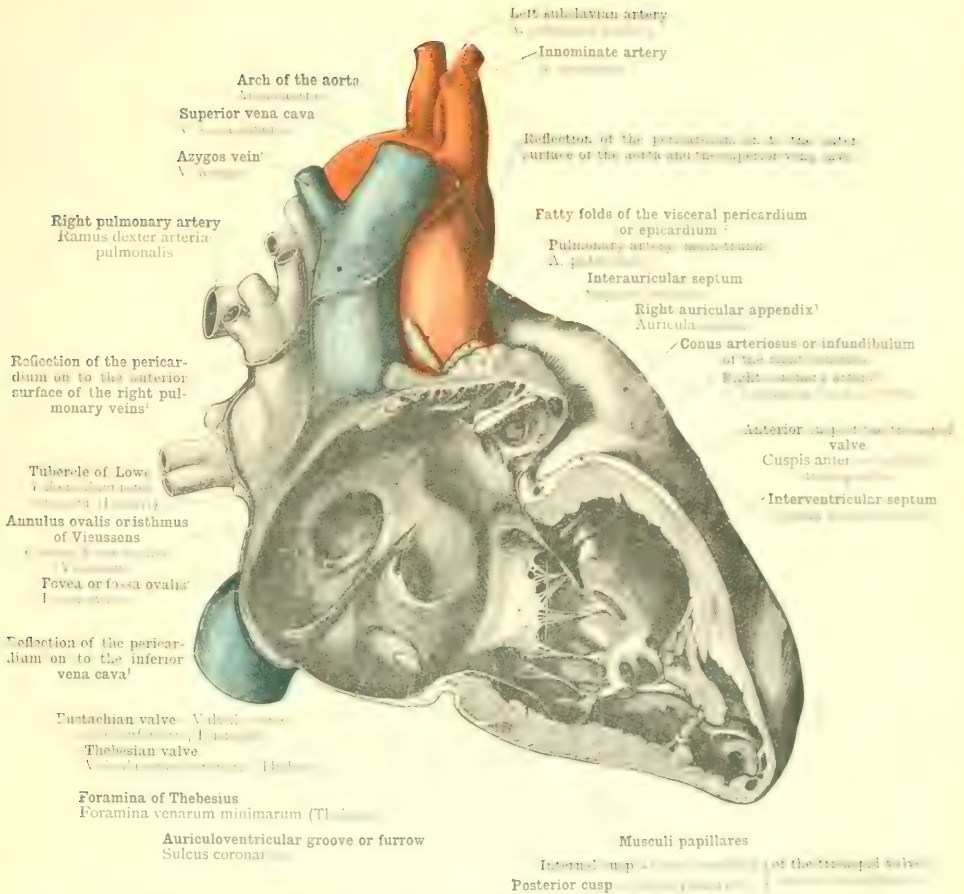


FIG. 147.—THE HEART SEEN FROM THE RIGHT SIDE.

The heart is situated in the middle of the thoracic cavity, between the lungs, and is the central organ of the circulatory system. It is composed of four chambers: the right and left atria and ventricles. The right atrium receives blood from the superior and inferior vena cavae, and the right ventricle pumps it to the lungs via the pulmonary artery. The left atrium receives blood from the pulmonary veins, and the left ventricle pumps it to the rest of the body via the aorta. The heart is surrounded by a double-walled sac called the pericardium, which contains a small amount of fluid to reduce friction. The heart is also supported by a network of blood vessels and nerves.

The right auricle—Atrium dextrum. The right ventricle—Ventriculus dexter.



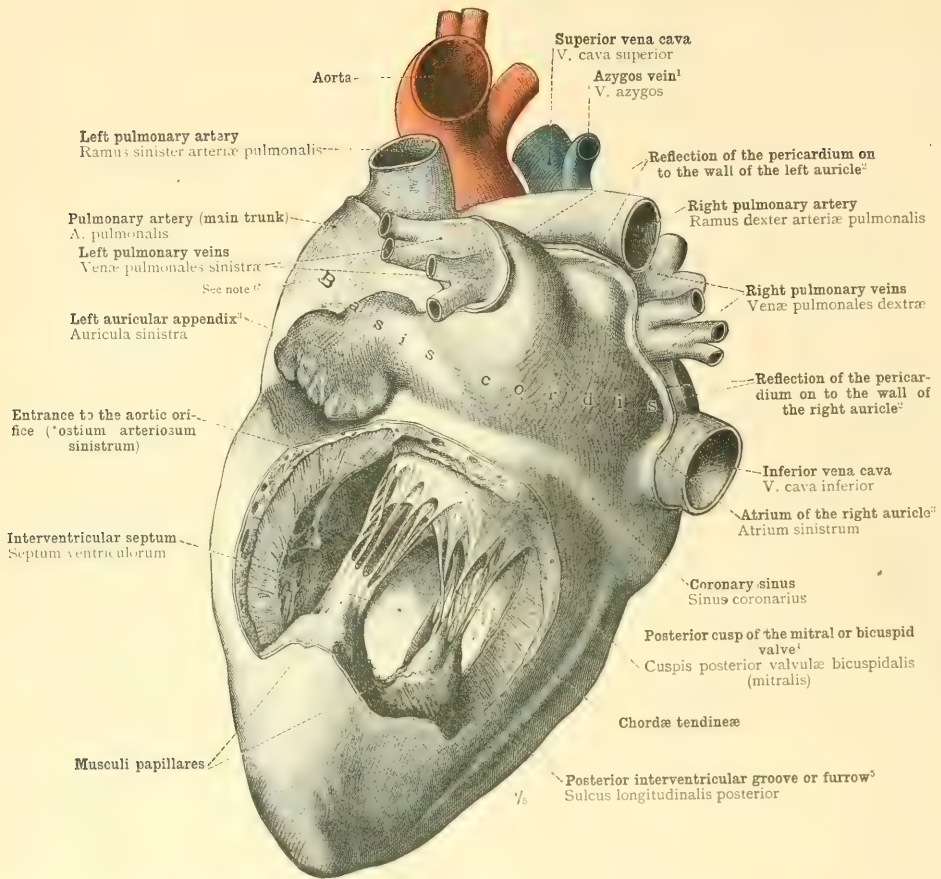


FIG. 948.—THE HEART SEEN FROM THE LEFT SIDE AND BELOW.

In the left ventricle, ventriculus sinister, which has been opened by the removal of a portion of its posterior wall, the mitral or bicuspid valve, valvula bicuspidalis (mitralis), the two musculi papillares, and the chordæ tendinæ of the latter, are displayed. At the base of the heart the reflection of the parietal pericardium to form the visceral pericardium of the auricles is seen (see notes <sup>1</sup> and <sup>2</sup> to p. 565). The preparation is the same as that shown in Fig. 946.

<sup>1</sup> Sometimes called the *right or large azygos vein*.

<sup>2</sup> On junction of the parietal with the visceral pericardium (epicardium); see also note <sup>3</sup> to page 565.

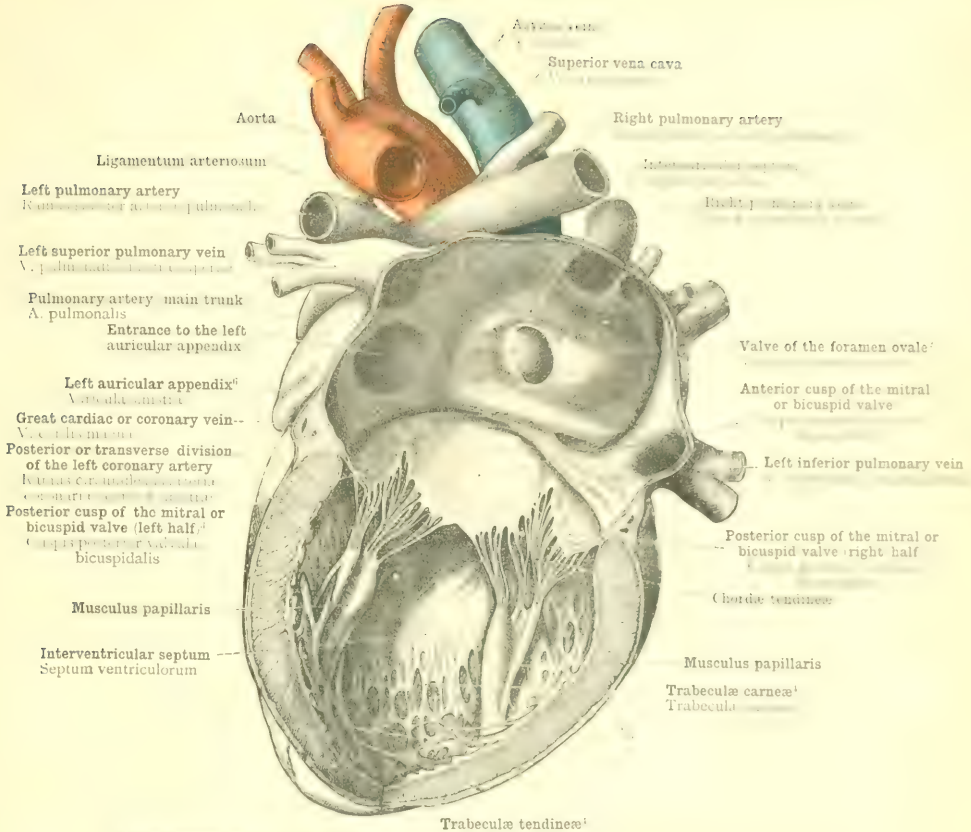
<sup>3</sup> See Appendix, note 11.

<sup>4</sup> *Mitral or Bicuspid Valve*.—The *cuspidæ* or *flaps* of this valve are named *anterior* and *posterior* respectively, but do not lie exactly in front and behind one another in common planes. The *anterior* flap, which is the larger of the two, is to the right as well as in front. Between the tip of the anterior cusp and the aortic orifice, the most prominent transverse fold of the mitral valve, the *posterior* and smaller flap lies to the left of a well-defined line, the chordæ tendinæ, which is attached to the wall of the ventricle. At each end of this chordæ, in the angles of junction of the large flaps, are small interchordal papillæ.

*Sulcus Longitudinalis*.—Strictly, this term, as used by the author, denotes, namely, the interventricular groove or furrow, anterior or posterior, as the case may be, but in addition the much less strongly marked interauricular groove or furrow. In the text, however, I have translated the term *sulcus longitudinalis*, *anterior*, *posterior*, *groove*, or *furrow*, according as the ventricle or the auricular part of the heart is indicated in the next figures. Dr.

*Flaps of the Bicuspid Valve*.—These terms are used by the author, as explanatory, to refer to that portion of the heart (together with the interventricular groove) of the great vessel that has already been seen and to the right of the interventricular groove. In England, however, the term *cuspidæ* of a heart has a different significance. (See also Appendix, note 11 to p. 565.)

#### Left ventricle—Ventriculus sinister.



The heart is a muscular organ that pumps blood throughout the body. It is divided into four chambers: the left atrium, left ventricle, right atrium, and right ventricle. The left side of the heart pumps oxygenated blood to the rest of the body, while the right side pumps deoxygenated blood to the lungs. The heart is surrounded by a double-walled sac called the pericardium, which contains a small amount of fluid to reduce friction as the heart beats.

### FIGURE 1. THE HEART AND ITS RELATIONS TO THE LUNGS.

The left ventricle is the lower chamber of the left side of the heart. It is the most muscular of the four chambers and is responsible for pumping oxygenated blood to the rest of the body. The left atrium is the upper chamber of the left side of the heart, and it receives oxygenated blood from the lungs. The right ventricle is the lower chamber of the right side of the heart, and it pumps deoxygenated blood to the lungs. The right atrium is the upper chamber of the right side of the heart, and it receives deoxygenated blood from the rest of the body. The heart is connected to the lungs by two main blood vessels: the pulmonary artery and the pulmonary vein. The pulmonary artery carries deoxygenated blood from the right ventricle to the lungs, and the pulmonary vein carries oxygenated blood from the lungs to the left atrium.

Left auricle—Atrium sinistrum. - Left ventricle Ventriculus sinister.



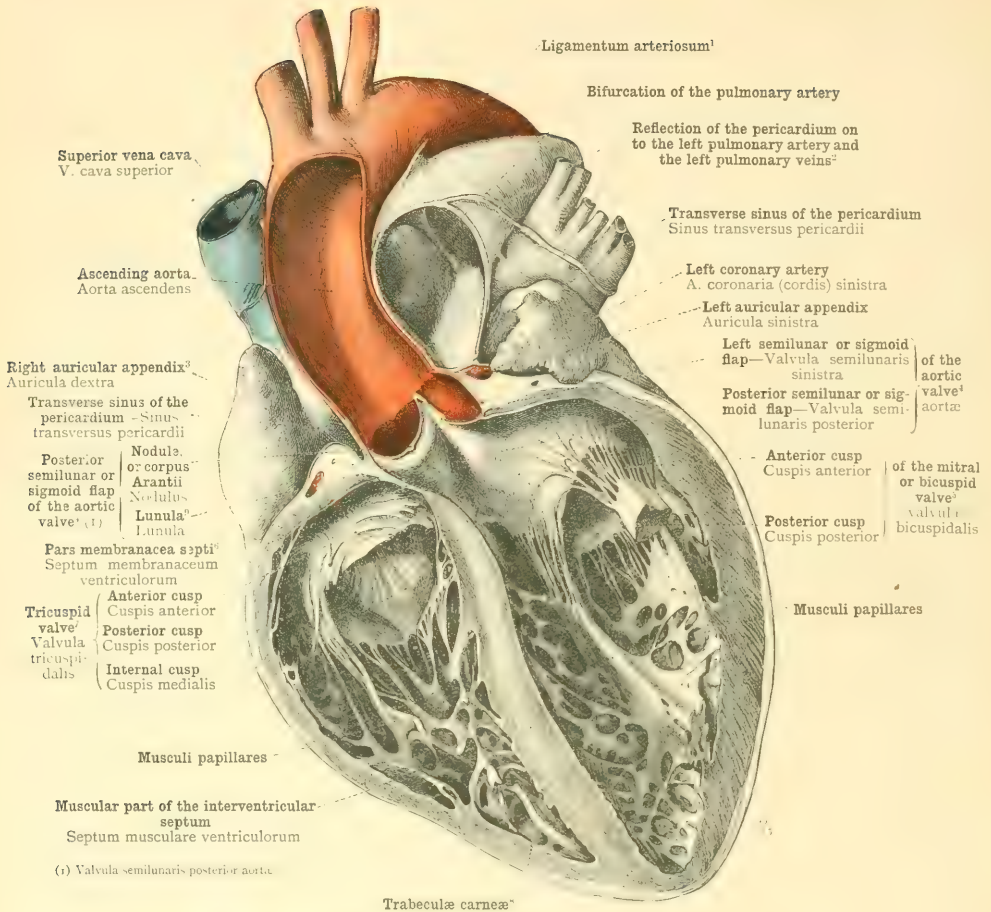


FIG. 950.—THE HEART SEEN FROM BEFORE.

The organ having been hardened in formalin in the distended state (*i.e.*, in diastole), the anterior portion of the "cone of the heart" (*i.e.*, the anterior portion of both ventricles—see *Appendix*, note 118), the anterior half of the ascending aorta, and the main trunk of the pulmonary artery nearly as far as the bifurcation, were removed by a coronal section. In the opened "cone of the heart," we see the interventricular septum, at the top of which is the pars membranacea septi, or undefended space (septum membranaceum ventriculorum); all the cusps of the mitral and tricuspid valves; and also the musculi papillares with their chordae tendineae. Of the auricles, the right and the left auricular appendages are visible; and between these and the aorta, on the right, and the main trunk of the pulmonary artery, on the left, the entrances to the transverse sinus of the pericardium. In the aortic orifice (ostium arteriosum sinistrum), the posterior semilunar or sigmoid flap of the aortic valve (see note 2 to p. 564), with its nodule, or corpus Arantii, and its two lunulae (see note 3 to p. 564), is preserved intact. On the anterior surface of the left pulmonary veins, the left pulmonary artery, and the superior vena cava, we see the reflection of the serous layer of the pericardium into the epicardium (see notes 1 and 2 to p. 565).

#### The Ventricles of the Heart and the Interventricular Septum.

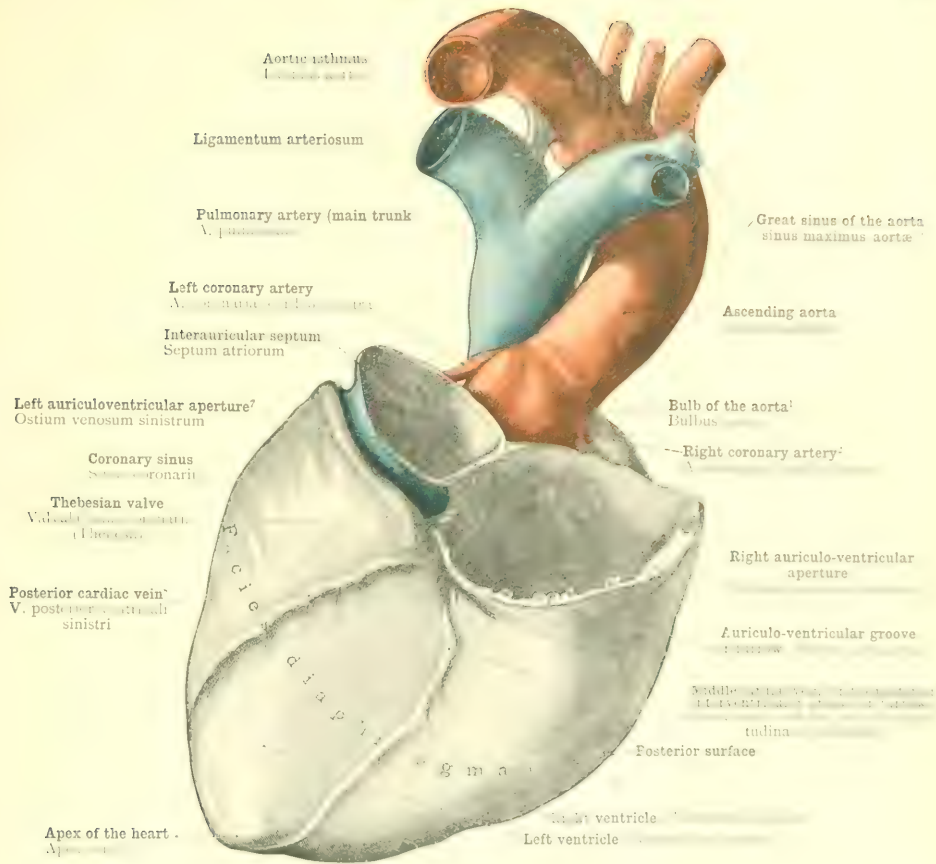


FIG. 951. THE POSTERIOR SURFACE, WITH DISSECTION, OF THE VENTRICULAR PORTION OF THE HEART. APPEARING AS IT WOULD BE, WITH THE MAIN TRUNK OF THE PULMONARY ARTERY AND ITS BRANCHES, AND THE CORONARY ARTERIES, AS THEY PASS FROM THE ARCH OF THE AORTA. THE BULB OF THE AORTA, THE MAIN TRUNK OF THE CORONARY ARTERIES, RIGHT AND LEFT, APPEARING AS THEY WOULD BE, WITH THE SINISTRA. THE L. AURICULO-VENTRICULAR, OR PULMONARY, AND THE DUCTUS ISTHMI, LIGAM. AORTAE.

The heart being situated in the thoracic cavity, it is surrounded by the pericardium, which is a double-layered structure. The outer layer is the pericardial sac, and the inner layer is the pericardial epithelium. The space between the two layers is the pericardial cavity, which contains a small amount of fluid to lubricate the heart as it beats.

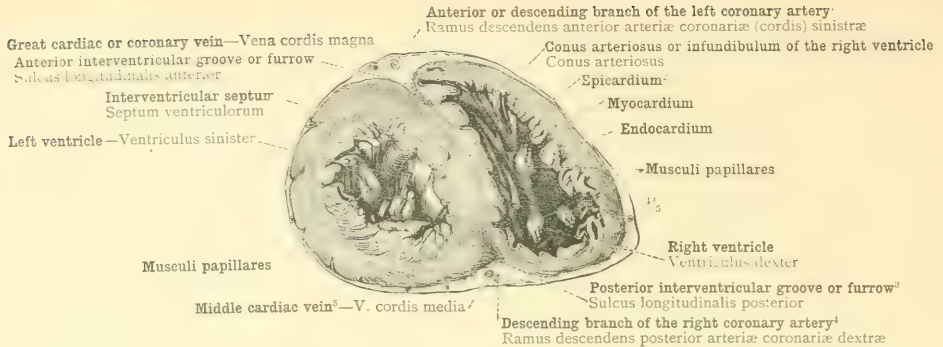


FIG. 952.—THE LOWER HALF OF THE TRANSVERSELY-DIVIDED \*CONE OF THE HEART (*i.e.*, THE VENTRICULAR PORTION OF THE HEART—see Appendix, note 118).

On the surface of the section we observe the nearly circular contour of the cavity of the left ventricle, and the sickle-shaped outline of that of the right ventricle; further, that the wall of the heart consists of the heart muscle, or myocardium, lined within by the endocardium, and enveloped without by the epicardium; and, finally, the notably greater thickness of the wall of the left ventricle.

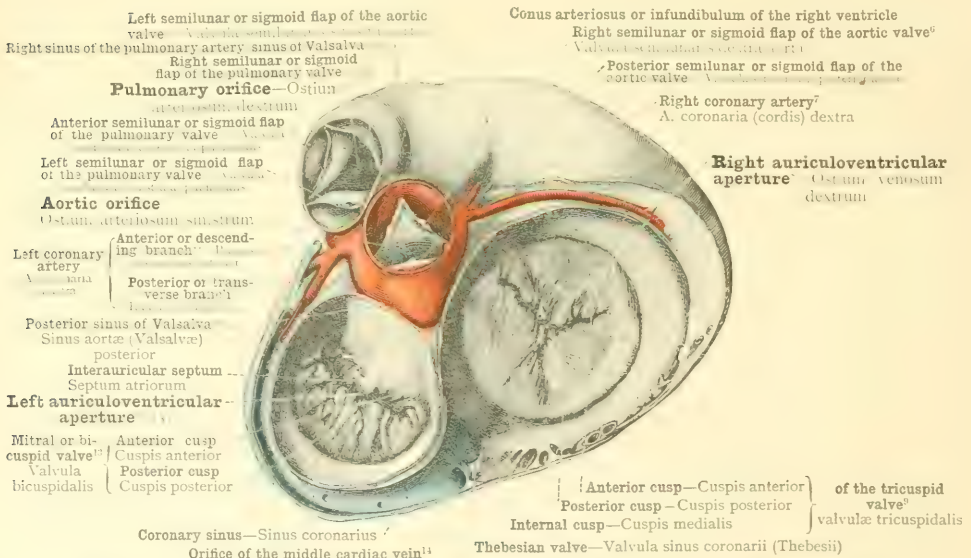


FIG. 953.—THE RELATIVE POSITION OF THE VALVES AND ORIFICES OF THE HEART, AND ALSO OF THE AORTA AND THE MAIN TRUNK OF THE PULMONARY ARTERY, JUST ABOVE THEIR RESPECTIVE VALVES.

The diagram illustrates the relative positions of the valves and orifices of the heart, and also of the aorta and the main trunk of the pulmonary artery, just above their respective valves. The diagram is a cross-section of the heart, showing the internal structures of the ventricles and the major vessels. The left ventricle is on the left, and the right ventricle is on the right. The aorta is at the top, and the pulmonary artery is at the bottom. The diagram is labeled with various anatomical structures in Latin and English.

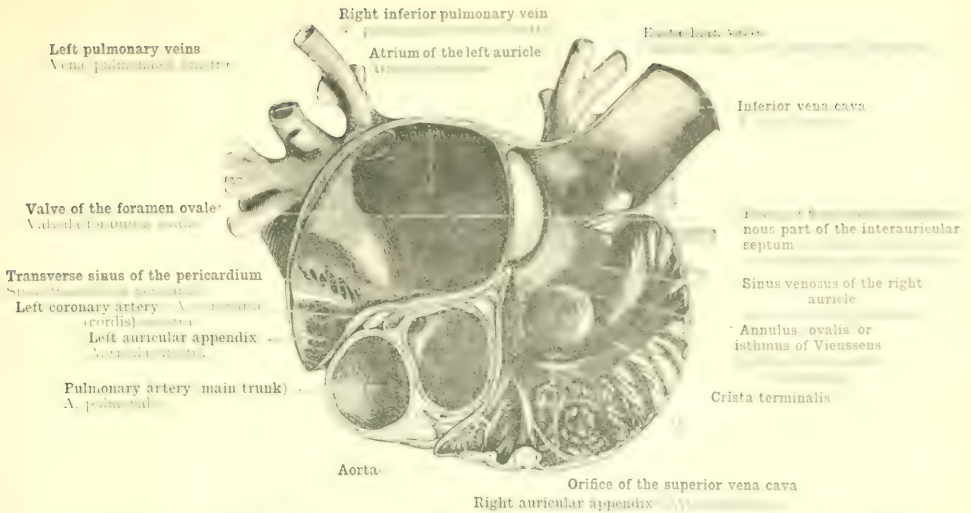


FIG. 954. SINUS TRANSVERSUS PERICARDII, THE TRANSVERSE SINUS OF THE PERICARDIUM, MUSCULI PECTINATI, AND CRISTA TERMINALIS OF THE RIGHT AURICLE. (See Venous Drainage of the Heart and the Interauricular Septum.)

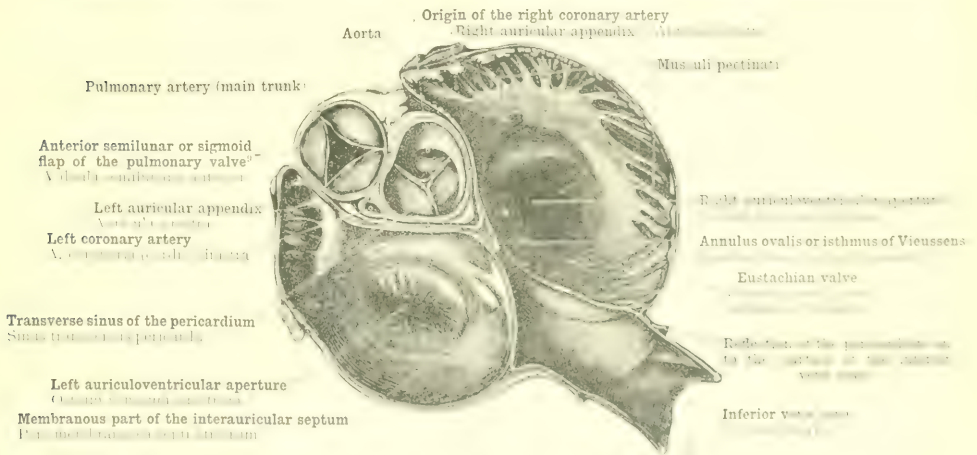


FIG. 955. THE SEMILUNAR OR SIGMOID FLAP OF THE PULMONARY VALVE, THE LEFT AURICLE, AND THE CRISTA TERMINALIS OF THE RIGHT AURICLE. (See Venous Drainage of the Heart and the Interauricular Septum.)

In Fig. 954 the upper segment, and in



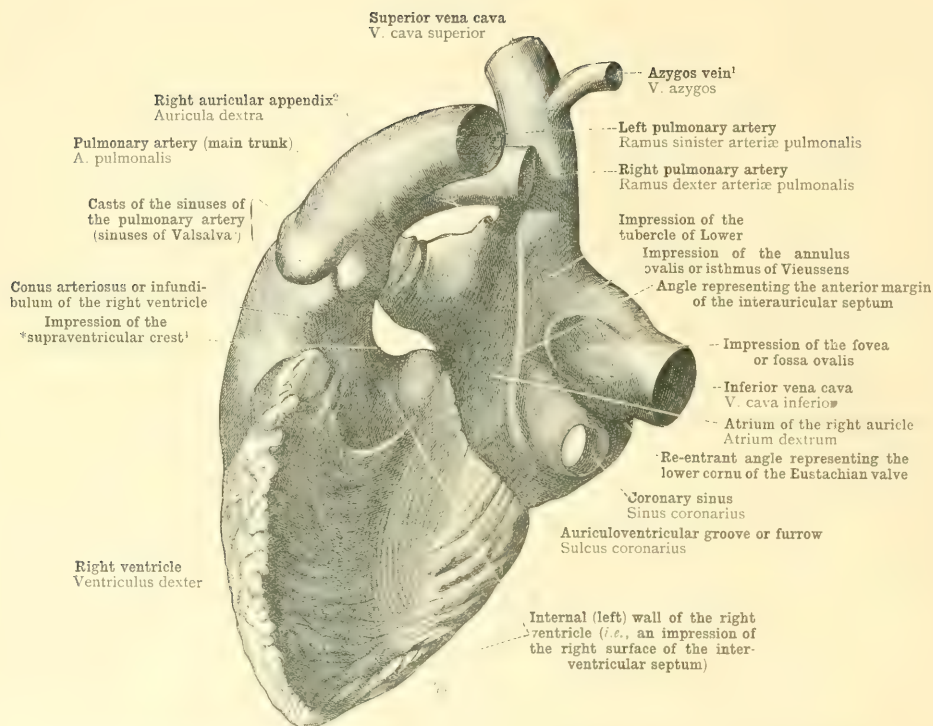
<sup>1</sup> Called also the *right or lower auricle*.<sup>2</sup> See Appendix, note 111.<sup>3</sup> See Appendix, note 112.<sup>4</sup> See note 4 to page 561.

FIG. 956.—CAST OF THE INTERIOR OF THE RIGHT SIDE OF THE HEART, WITH THE MAIN TRUNK AND THE BIFURCATION OF THE PULMONARY ARTERY, THE PROXIMAL EXTREMITIES OF THE SUPERIOR AND INFERIOR VENÆ CAVÆ, AND THE CORONARY SINUS, SEEN FROM THE INNER SIDE.

The Configuration of the Right Side of the Heart.



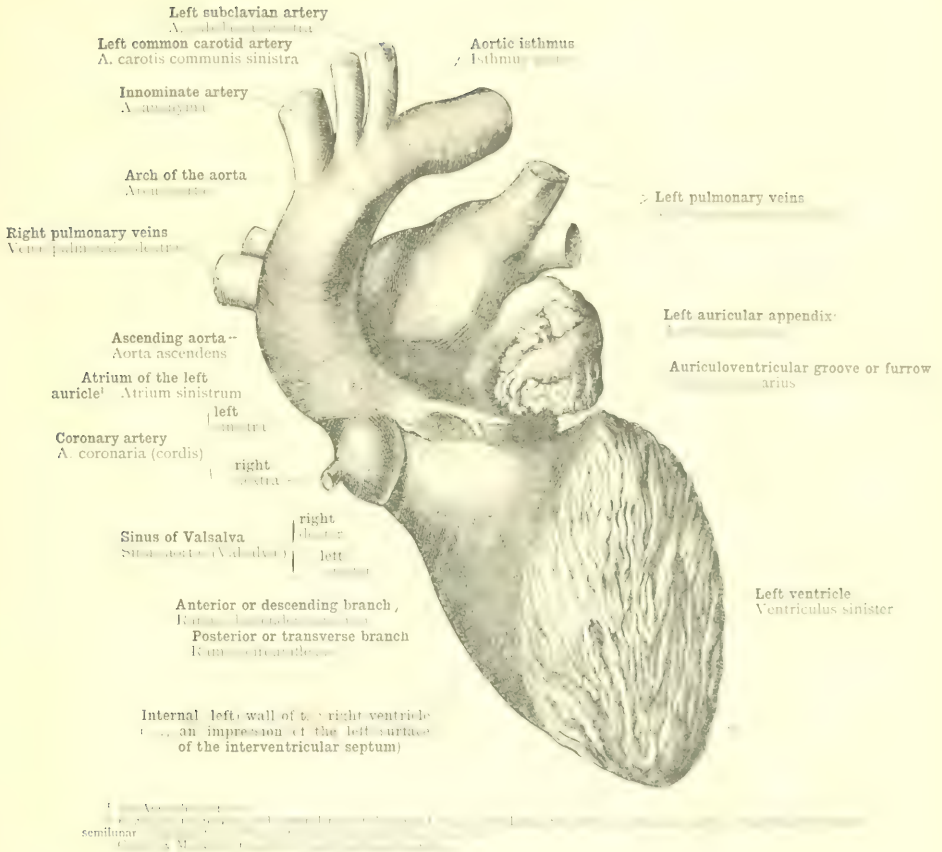


FIG. 957.—CAST OF THE INTERIOR OF THE LEFT SIDE OF THE HEART, WITH THE VALVE OF THE AORTA. POINT A LITTLE BEYOND THE ISTHMUS, THE COMMENCEMENT OF THE CORONARY ARTERY, AND THE PROXIMAL EXTREMITIES OF THE SUPERIOR AND INFERIOR VENA CAVA, SHOWN FROM THE INNER SIDE.

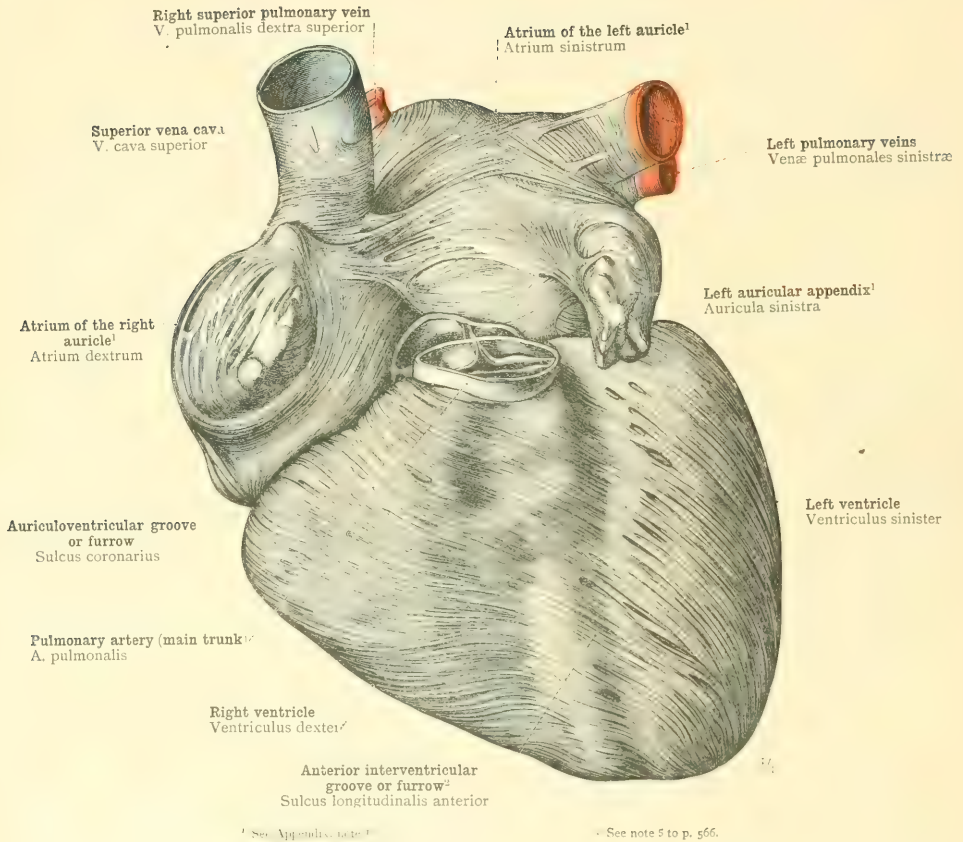


FIG. 958.—SUPERFICIAL FIBRES OF THE MYOCARDIUM ON THE ANTERIOR SURFACE OF THE VENTRICLES AND AURICLES.

The heart was injected with tallow prior to dissection.

The Myocardium.

# THE HEART

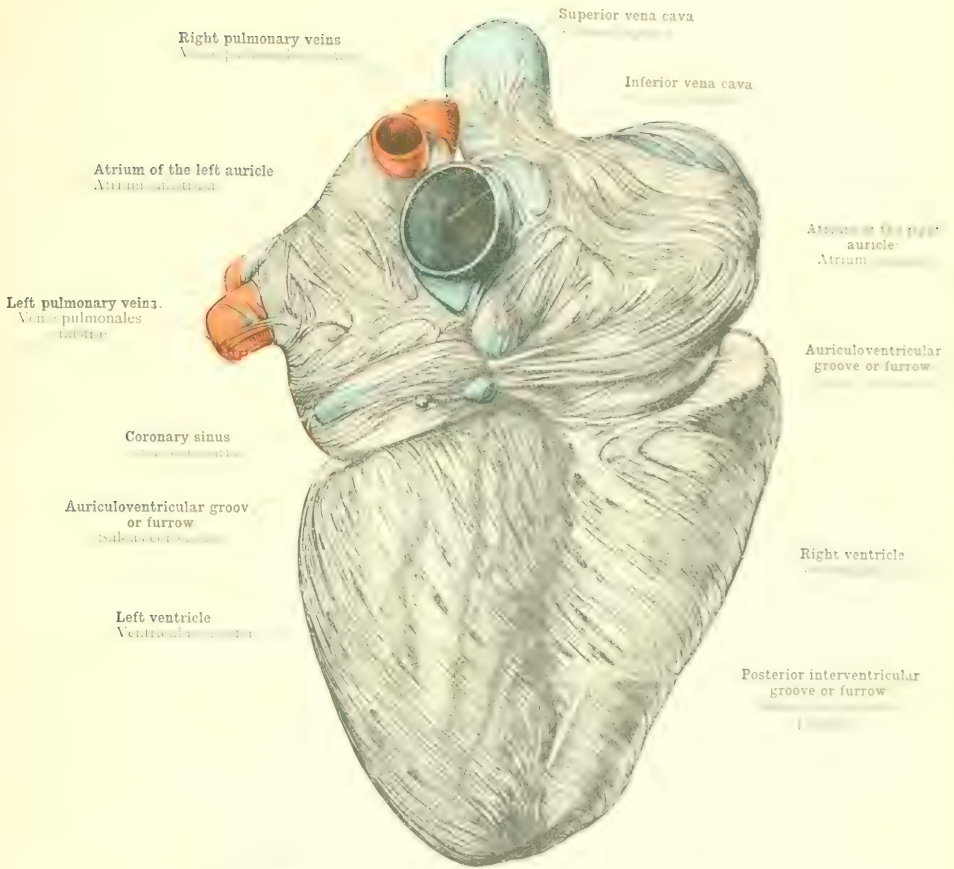
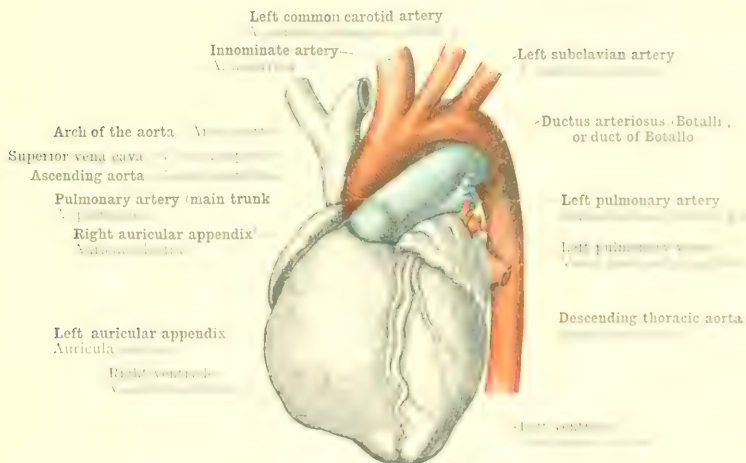
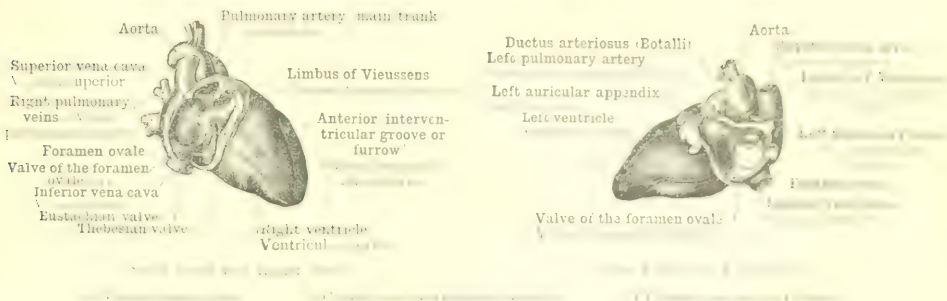
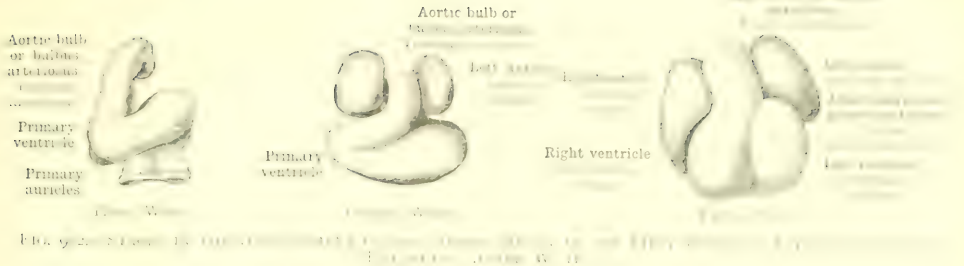


FIG. 959.—SUPERFICIAL FIELD OF THE MYOCARDIUM (EXTERNAL SURFACE OF THE VENTRICLES AND AURICLES).

The preparation is from a human heart.

The Myocardium.







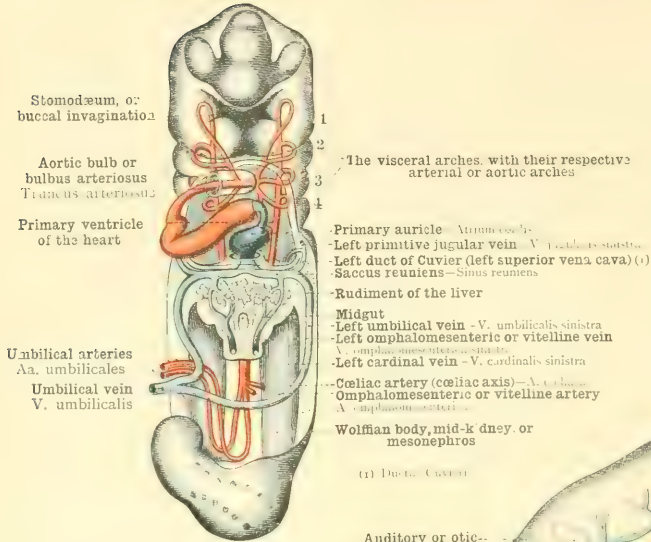
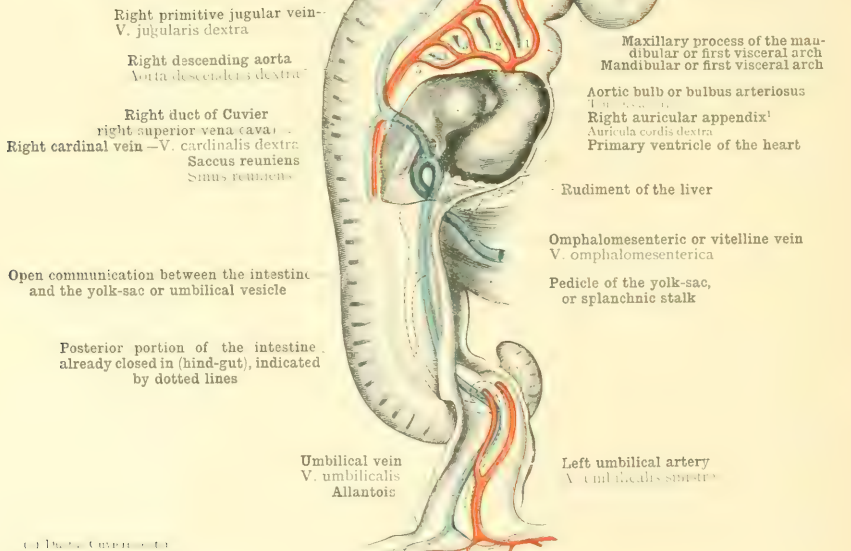


FIG. 965.—THE VASCULAR SYSTEM IN A HUMAN EMBRYO OF ABOUT EIGHTEEN TO TWENTY DAYS, HAVING A BODY-LENGTH OF 1/16 INCH (2.6 MILLIMETRES), SEEN FROM BEFORE. (COMPILED FROM TWO DRAWINGS BY W. HIS.)



(2) See Appendix.

FIG. 966.—CONNECTION OF THE HEART AND VASCULAR SYSTEM IN A HUMAN EMBRYO OF THE TWENTY-SECOND OR TWENTY-THIRD DAY, HAVING A BODY-LENGTH OF 1/8 INCH (3.2 MILLIMETRES), SEEN FROM THE RIGHT SIDE. (AFTER W. HIS.)

The Vascular System at the End of the Third and in the Beginning of the Fourth Week of Intra-uterine Life.

Internal carotid artery  
A. carotis interna

The five paired arterial  
or aortic arches

Aortic bulb or bulbus  
arteriosus

Descending thoracic aorta



Right common carotid  
artery  
A. carotis communis

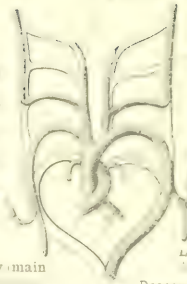
Internal carotid  
artery

Right pulmonary artery

Right vertebral artery

Pulmonary artery (main  
trunk)

Ascending aorta



Left

carotid artery

A. carotis interna

Ductus arteriosus

or duct of Botallo

Left pulmonary artery

Left vertebral artery

Left subclavian artery

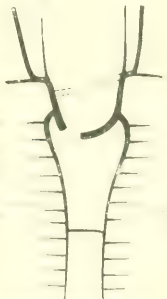
Descending thoracic aorta

Fig. 1. Rudimentary condition of the arterial system. The five paired aortic arches, the aortic bulb, the descending thoracic aorta, the ascending aorta, the right common carotid artery, the right internal carotid artery, the right pulmonary artery, the right vertebral artery, the right subclavian artery, the left common carotid artery, the left internal carotid artery, the left pulmonary artery, the left vertebral artery, the left subclavian artery, the ductus arteriosus, the descending thoracic aorta, the ascending aorta.

Left innominate vein

Duct of Cuvier, or  
superior vena cava

Right cardinal vein



External jugular vein - V

Internal jugular vein

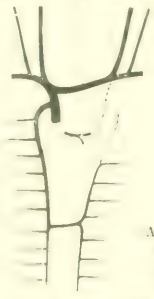
Left subclavian  
vein  
clavia sinistra

Left cardinal vein

Right subclavian  
vein  
clavia dextra

Superior vena cava  
Coronary sinus of  
the heart

Azygos vein



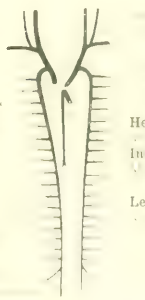
Accessory branch

Fig. 2. Rudimentary condition of the venous system. The left innominate vein, the right innominate vein, the external jugular vein, the internal jugular vein, the left subclavian vein, the right subclavian vein, the superior vena cava, the coronary sinus of the heart, the azygos vein, the left cardinal vein, the right cardinal vein, the duct of Cuvier, the accessory branch.

Ducts of Cuvier (superior  
vena cava, right and left)

Right cardinal vein

Externally they are continued into  
the external jugular vein  
Hypogastric becoming the in-  
ternal iliac vein



External jugular vein - V

Internal jugular vein

Left subclavian  
vein

Hepatic veins

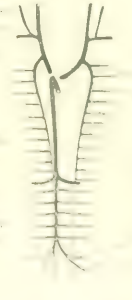
Inferior vena cava

Left cardinal vein

Right subclavian  
vein

Inferior vena cava

Renal vein



Right External Carotid  
vein (superior vena cava)

Left External Carotid  
vein (superior vena cava)

Hepatic vein

Left cardinal vein

External iliac vein (becoming  
the internal iliac vein)

Hypogastric (becoming  
the internal iliac vein)

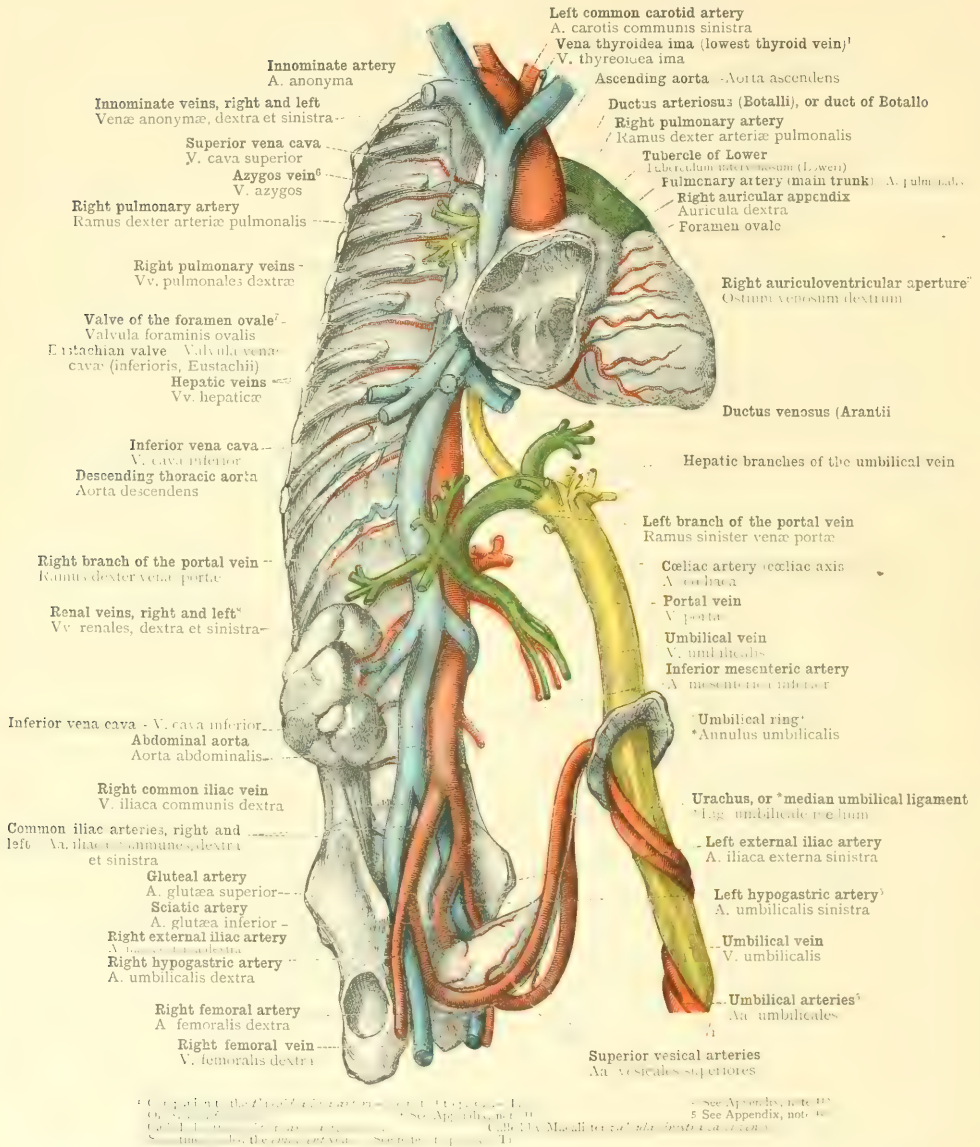
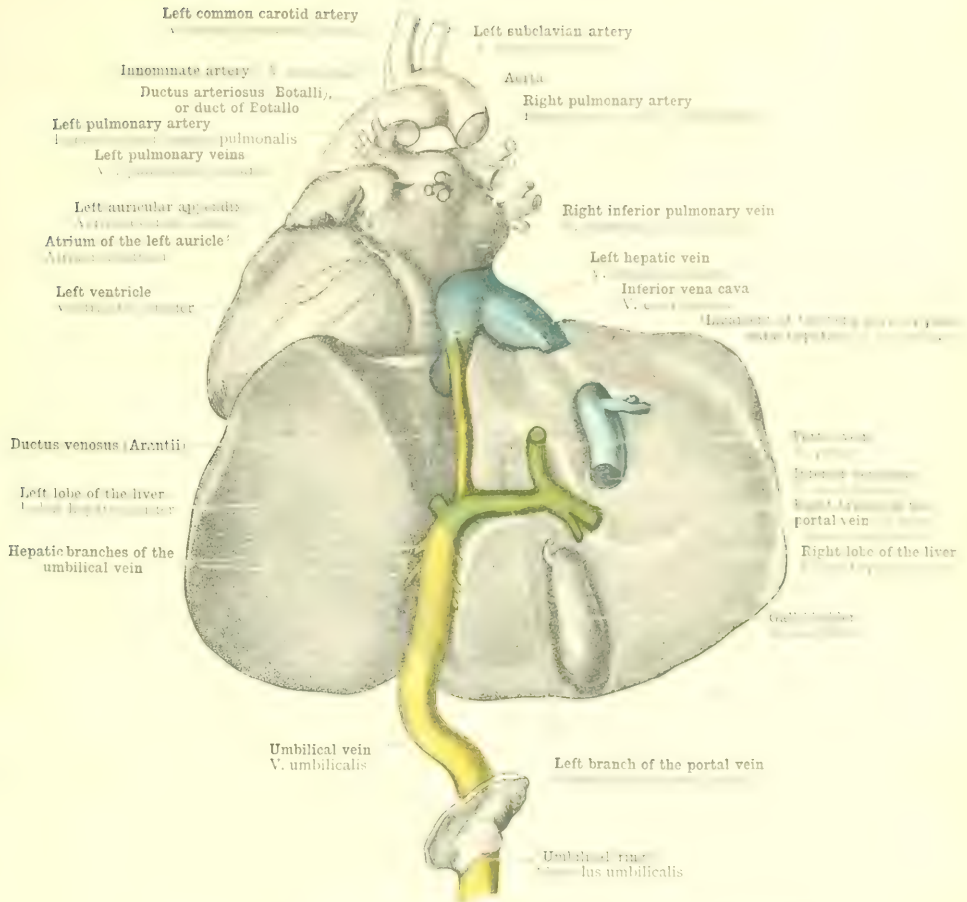


FIG. 970.—THE CIRCULATORY APPARATUS OF THE FŒTUS, AS SEEN IN AN INFANT STILL-BORN AT FULL TERM. VIEWED FROM THE RIGHT SIDE.

The right wall of the right auricle has been removed, to show the foramen ovale and its valve, and also the Eustachian valve. The umbilical vein with its hepatic branches and the ductus venosus (Arantii) are coloured yellow; the portal vein, the pulmonary arteries, and the ductus arteriosus (Botalli), are coloured green.

### The Fœtal Circulatory Apparatus.



### The Fœtal Circulation in Relation to the Liver.



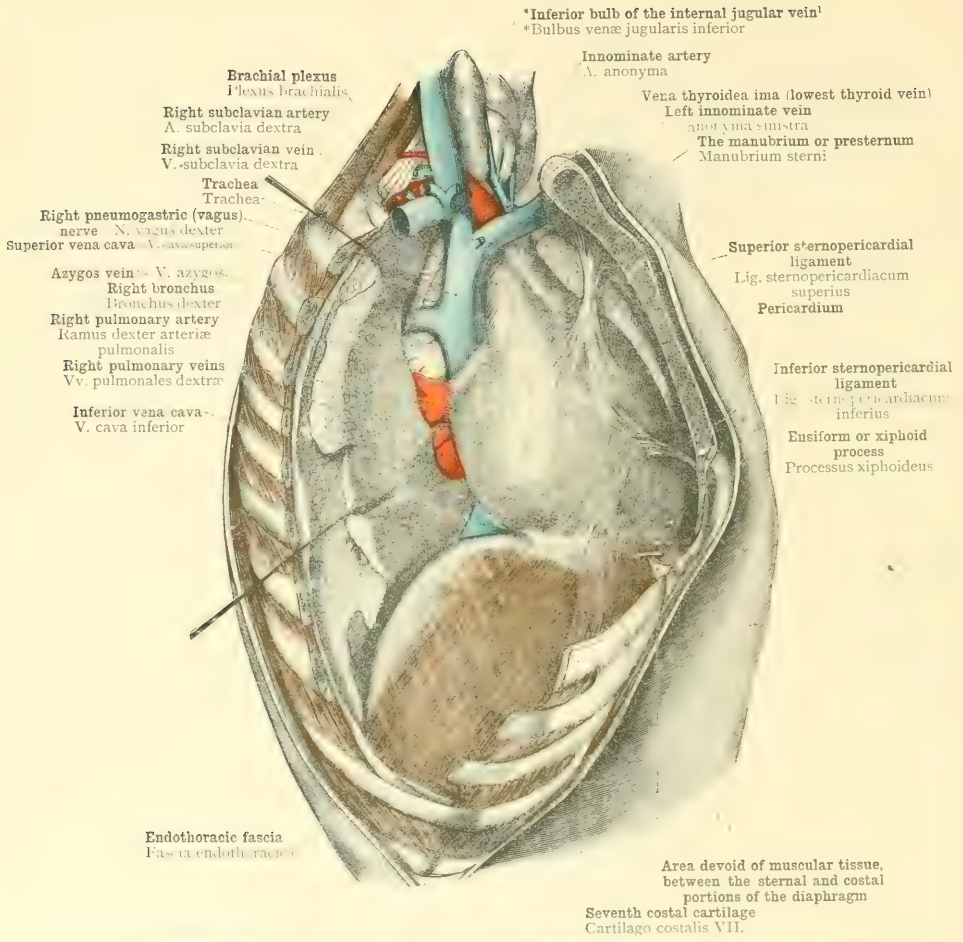


FIG. 972.—POSITION AND RELATIONS OF THE PERICARDIUM; ITS CONNEXIONS WITH THE ENDOTHORACIC FASCIA AND WITH THE DIAPHRAGM. PROLONGATION OF THE FIBROUS LAYER OF THE PERICARDIUM TO FORM TUBULAR INVESTMENTS FOR THE AORTA, THE SUPERIOR VENA CAVA, AND THE RIGHT PULMONARY VEINS. THE SUPERIOR AND INFERIOR STERNOPERICARDIAL LIGAMENTS. SEEN FROM THE RIGHT SIDE AND BEFORE.

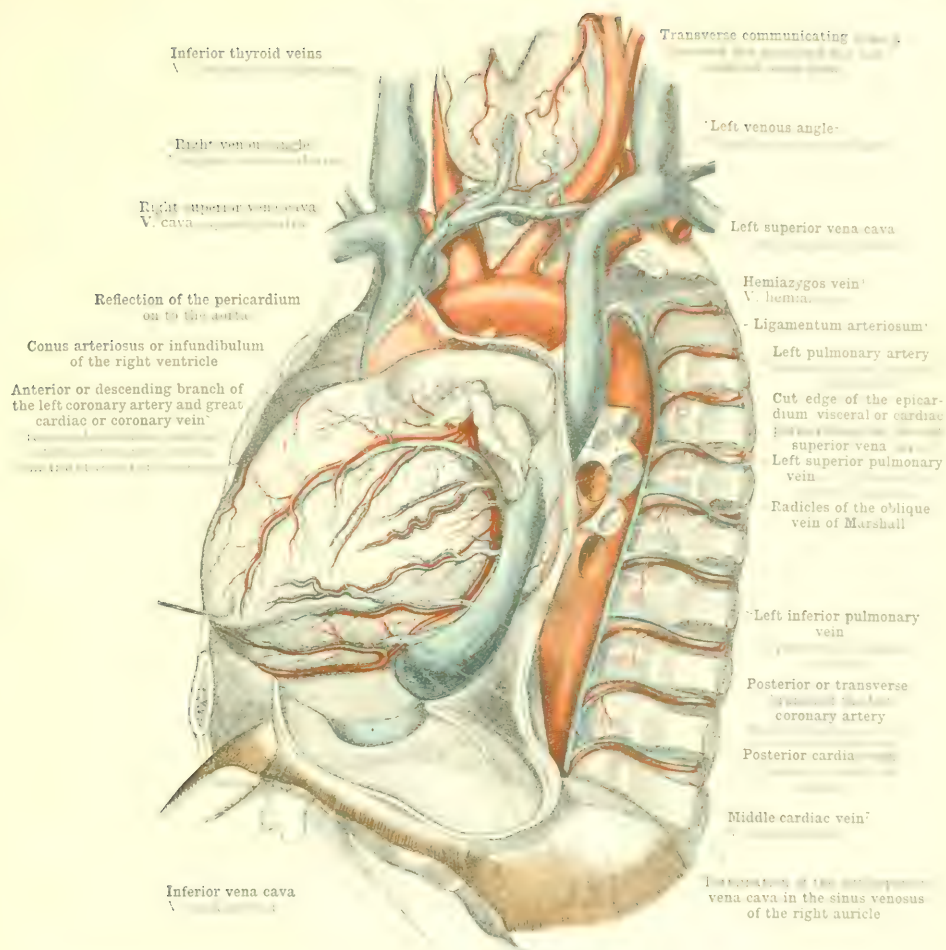
The sternum having been divided sagittally in the median plane, its left half was drawn a little forwards; the rest of the thorax was removed as far down as the ninth rib; and the right lung was drawn backwards as far as possible, in order to display the vessels forming its root.

#### The Pericardium.—The Sternopericardial Ligaments.









Persistent Left Superior Vena Cava

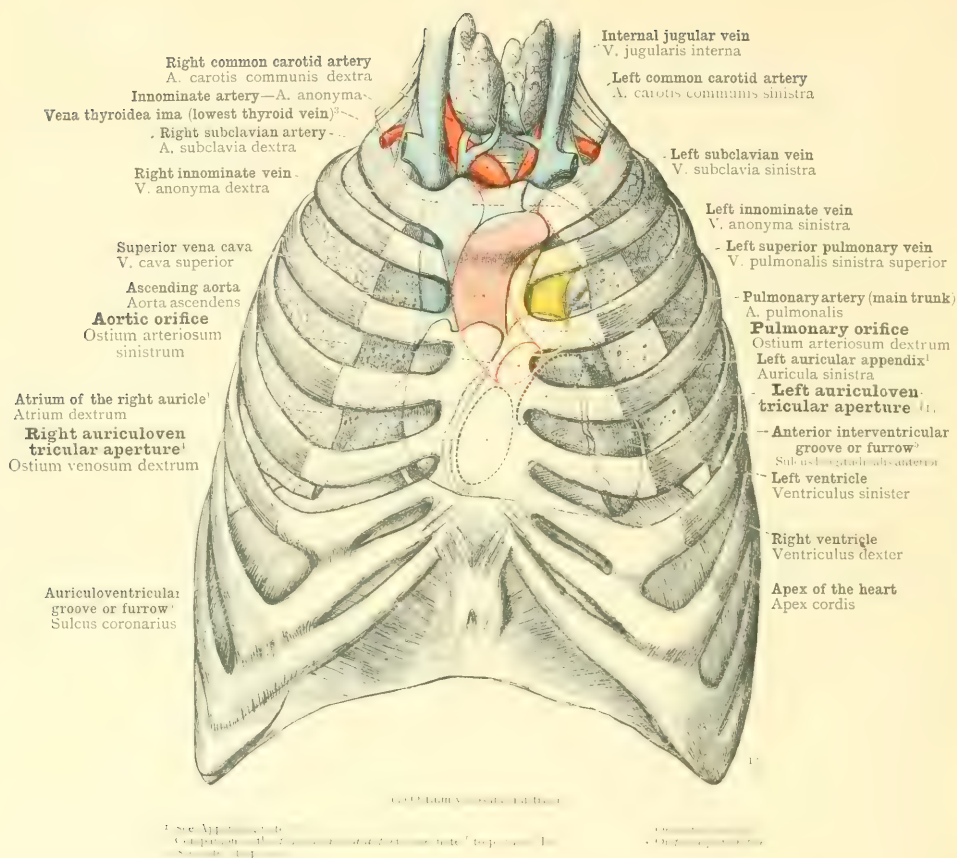


FIG. 976.—POSITION OF THE HEART AND THE GREAT VESSELS AND OF THE CARDIAC ORIFICES, AND THE PROJECTION-OUTLINES OF THESE STRUCTURES ON THE ANTERIOR WALL OF THE THORAX.

After preliminary hardening with formalin, the pericardium was exposed in the intercostal spaces. The sternum was then sawn across horizontally at the level of the second and the sixth intercostal spaces, and was removed with a sufficient extent of the attached ribs and rib-cartilages to lay the heart fully bare. The excised portion of the wall of the thorax having been replaced in its position, the preparation was then photographed, first with, and then without, the excised segment, and the projection-outline of the heart was thus determined. By means of suitable incisions, the position and extent of the respective orifices was determined, as well as their projection-outlines upon the anterior surface of the heart. The cartilage of the eighth rib is in this specimen directly attached to the sternum; and the innominate and the left common carotid artery arise from the aorta by a common trunk.

Position and Projection-Outlines of the Heart, the Cardiac Orifices, and the Great Vessels.



ARTERIA PULMONALIS  
THE PULMONARY ARTERY

ARTERIÆ TRUNCI  
THE ARTERIES OF THE TRUNK

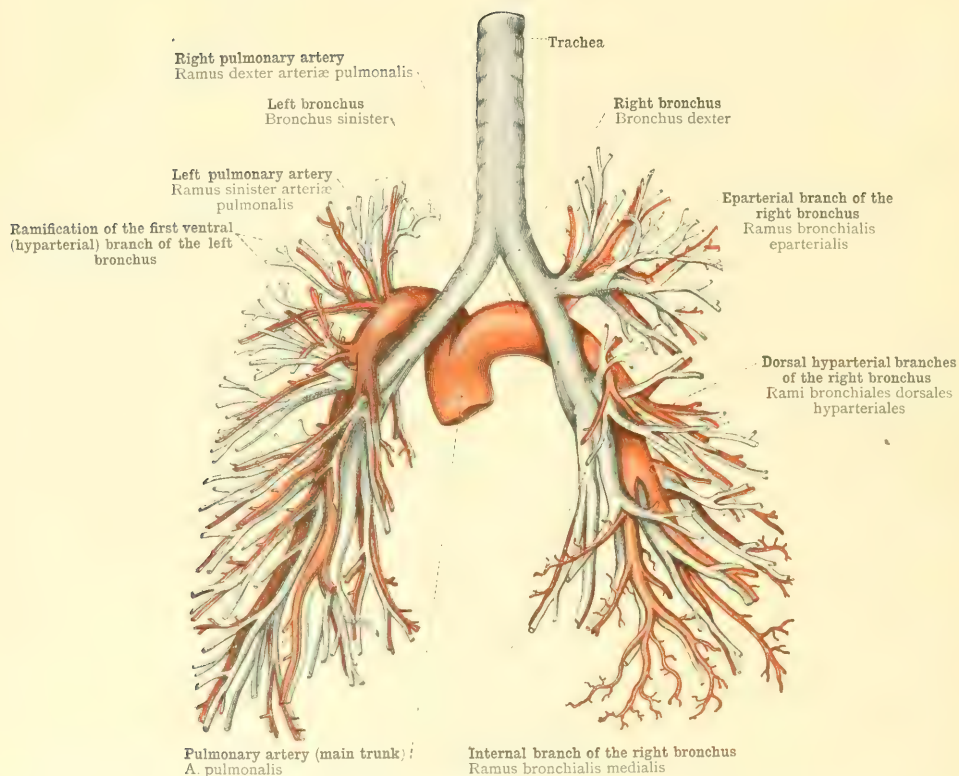


FIG. 977.—THE MAIN TRUNK OF THE PULMONARY ARTERY, ARTERIA PULMONALIS; ITS BIFURCATION INTO THE RIGHT AND THE LEFT PULMONARY ARTERY, RAMUS DEXTER ET RAMUS SINISTER ARTERIÆ PULMONALIS; THE RAMIFICATION OF THE PULMONARY ARTERIES WITHIN THE LUNG, AND THEIR RELATION TO THE BRONCHIAL RAMIFICATION. SEEN FROM BEHIND.

Arteria pulmonalis—The pulmonary artery.

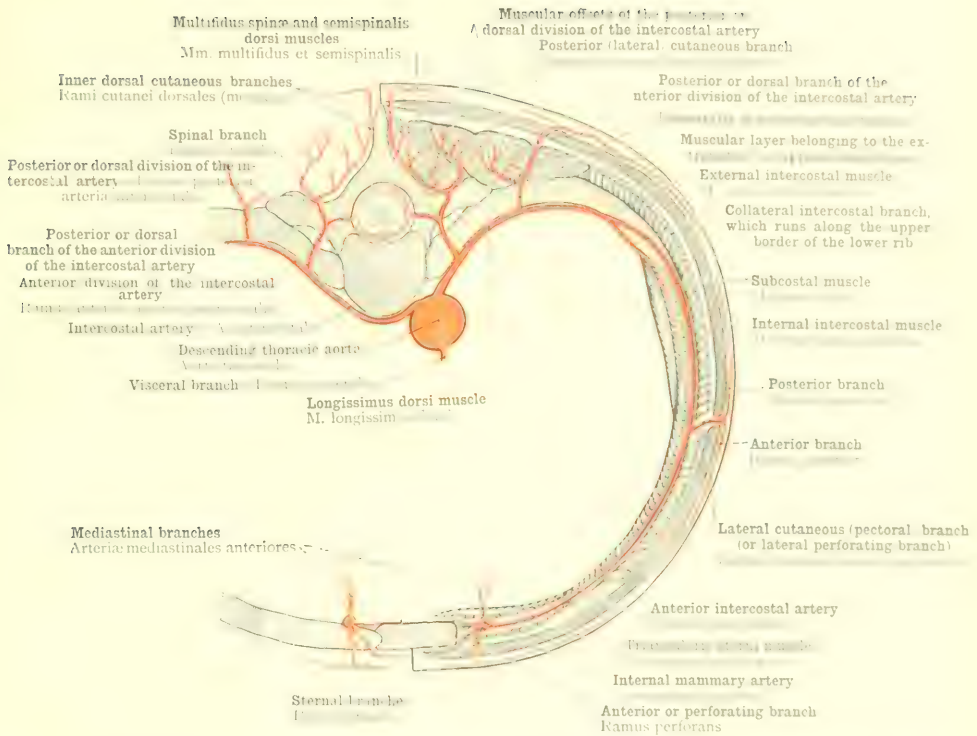
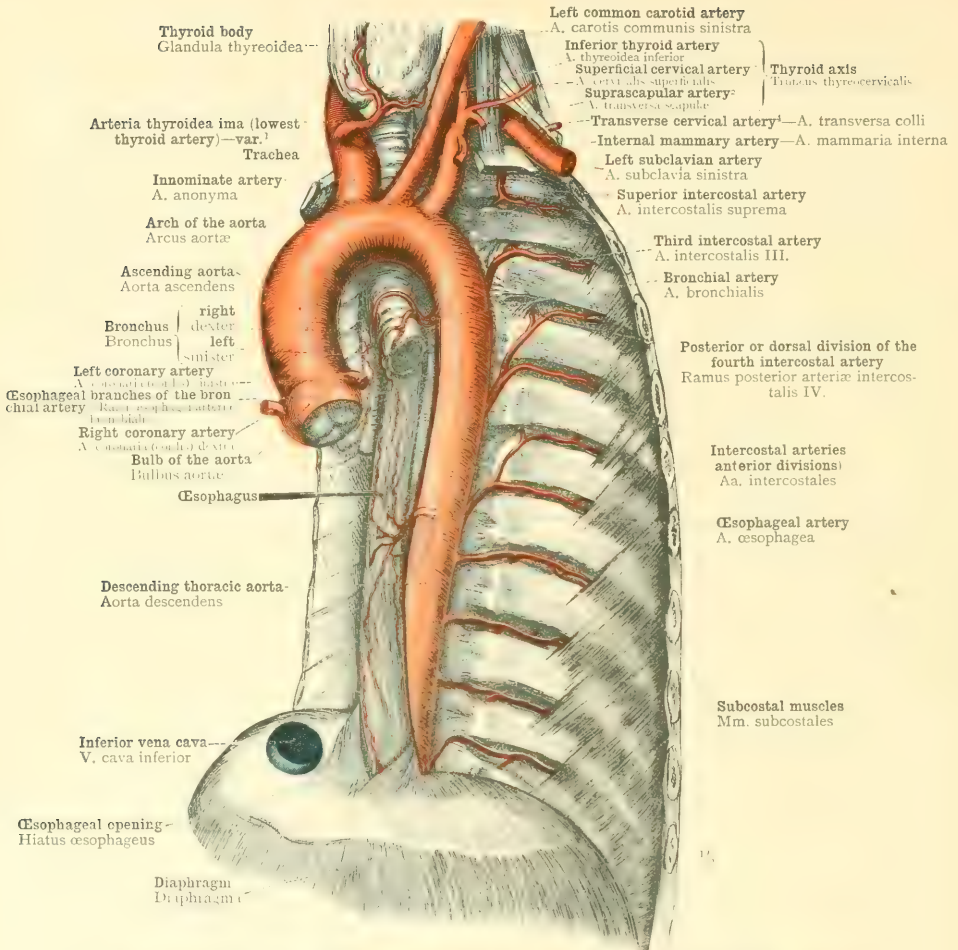


FIG. 978.—DIAGRAMMATIC REPRESENTATION OF THE DISTRIBUTION OF THE ARTERIES SUPPLYING THE BODY WALL, DEOWN'S A THORACIC SECTION.

Diagram of the Arteries of the Body-Wall.



<sup>1</sup> Arteria thyroidea ima (lowest thyroid artery). This artery not infrequently exists in the body in every ten. It may arise from the innominate trunk (most frequently) or the left common carotid or from the arch of the aorta. In exceptional instances it springs from the internal mammary artery or from the subclavian artery. It is usually very small, but occasionally it is larger than the other thyroid arteries. Lying in front of the trachea, it can be distinguished from the other thyroid arteries by its position in the neck.

<sup>2</sup> Superior intercostal arteries. The first three intercostal arteries arise from the subclavian artery, the fourth from the aorta.

<sup>3</sup> Or. a. intercostalis suprema (M. dated). See Appendix, p. 177.

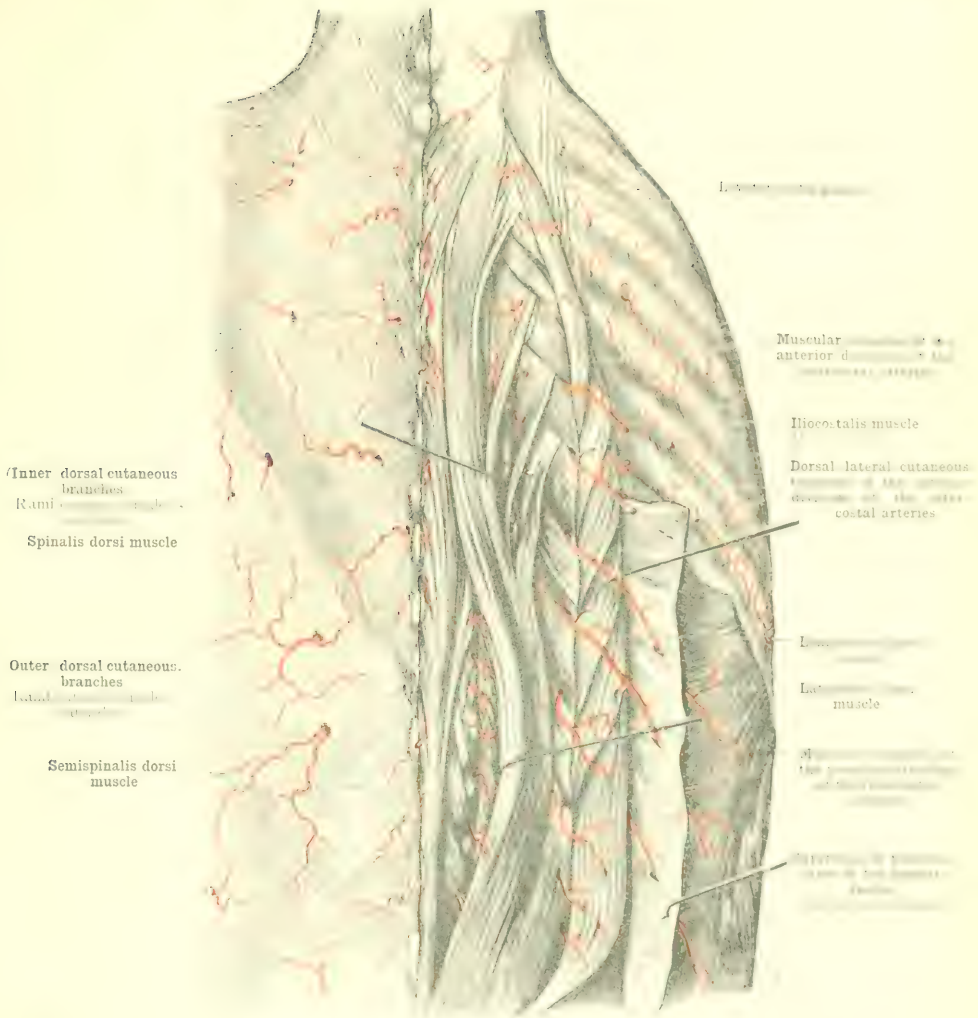
<sup>4</sup> See Appendix, notes 134, 135, 177.

FIG. 97).—AORTA THORACALIS, THE THORACIC AORTA (CONSISTING OF THE ASCENDING AORTA, THE ARCH OF THE AORTA, AND THE DESCENDING THORACIC AORTA), WITH ITS VISCERAL AND PARIETAL BRANCHES SEEN FROM THE LEFT SIDE AND BEFORE. BRONCHIAL ARTERIES, ARTERIE BRONCHIALES. ESOPHAGEAL ARTERIES, ARTERIE ESOPHAGEÆ. INTERCOSTAL ARTERIES, ARTERIE INTERCOSTALES, IN ALL THE LEFT INTERCOSTAL SPACES EXCEPT THE UPPERMOST, ARE EXPOSED AS FAR FORWARDS AS THE INTERNAL INTERCOSTAL AND SUBCOSTAL MUSCLES. THEIR DIVISION INTO ANTERIOR AND POSTERIOR BRANCHES (RAMI ANTERIORES ET POSTERIORES) IS SEEN, AND THE ORIGIN OF THE MUSCULAR BRANCHES (RAMI MUSCULARES) OF THE FORMER.

The specimen shows a frequent variety in the origin of the fourth and fifth and of the sixth and seventh intercostal arteries from common roots. The second intercostal artery consists of the distal portion of the superior intercostal artery (arteria intercostalis suprema), which arises from the costocervical axis (truncus costocervicalis—see Appendix, note 177). From the subclavian artery arises the abnormal lowest thyroid artery of Neubauer, arteria thyroidea ima (see note 1 above).

Aorta thoracalis, the thoracic aorta.—Aa. bronchiales et esophageæ, the bronchial and esophageal arteries.—Aa. intercostales, the intercostal arteries.





Rami Posteriores, Posterior or Dorsal Branches, of the Intercostal Arteries.

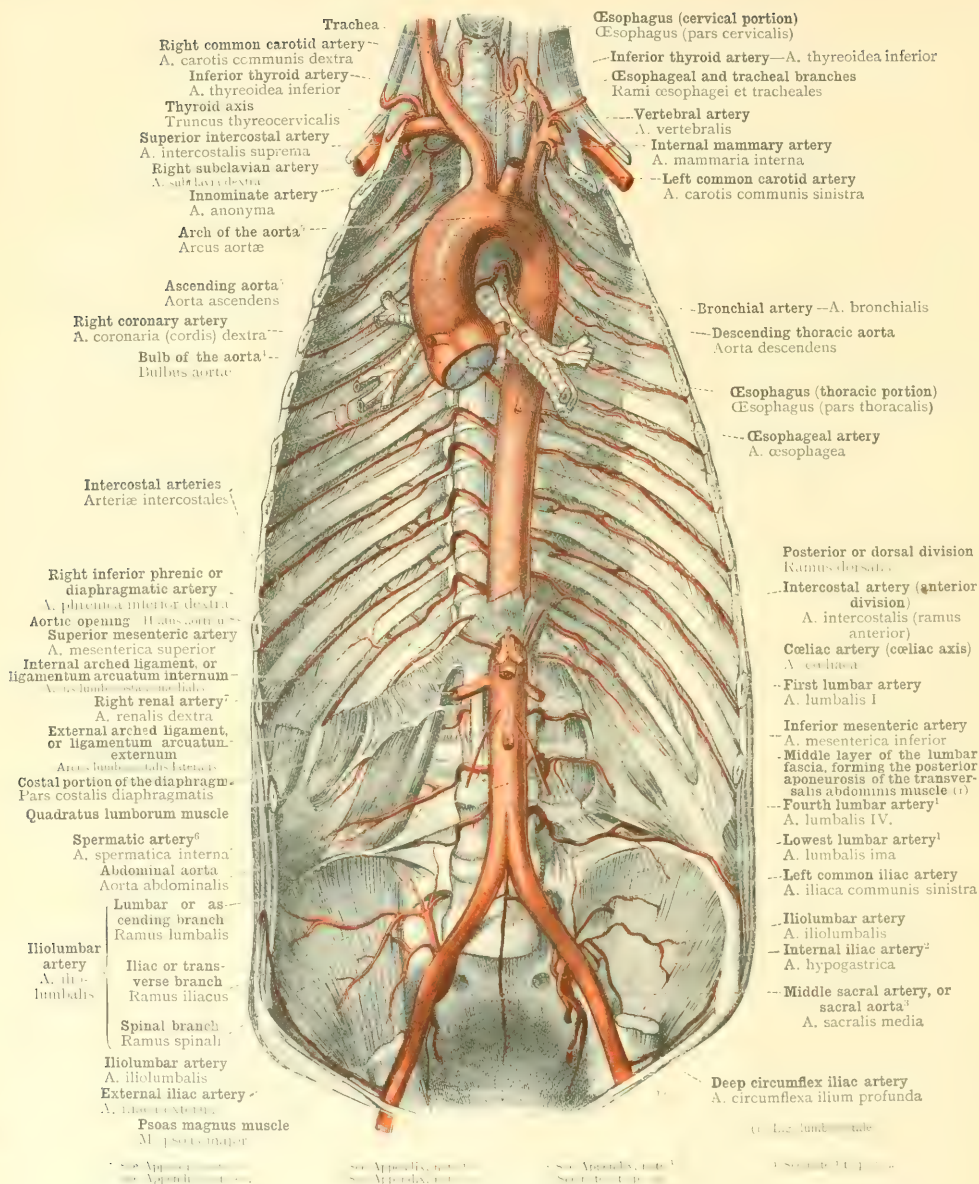
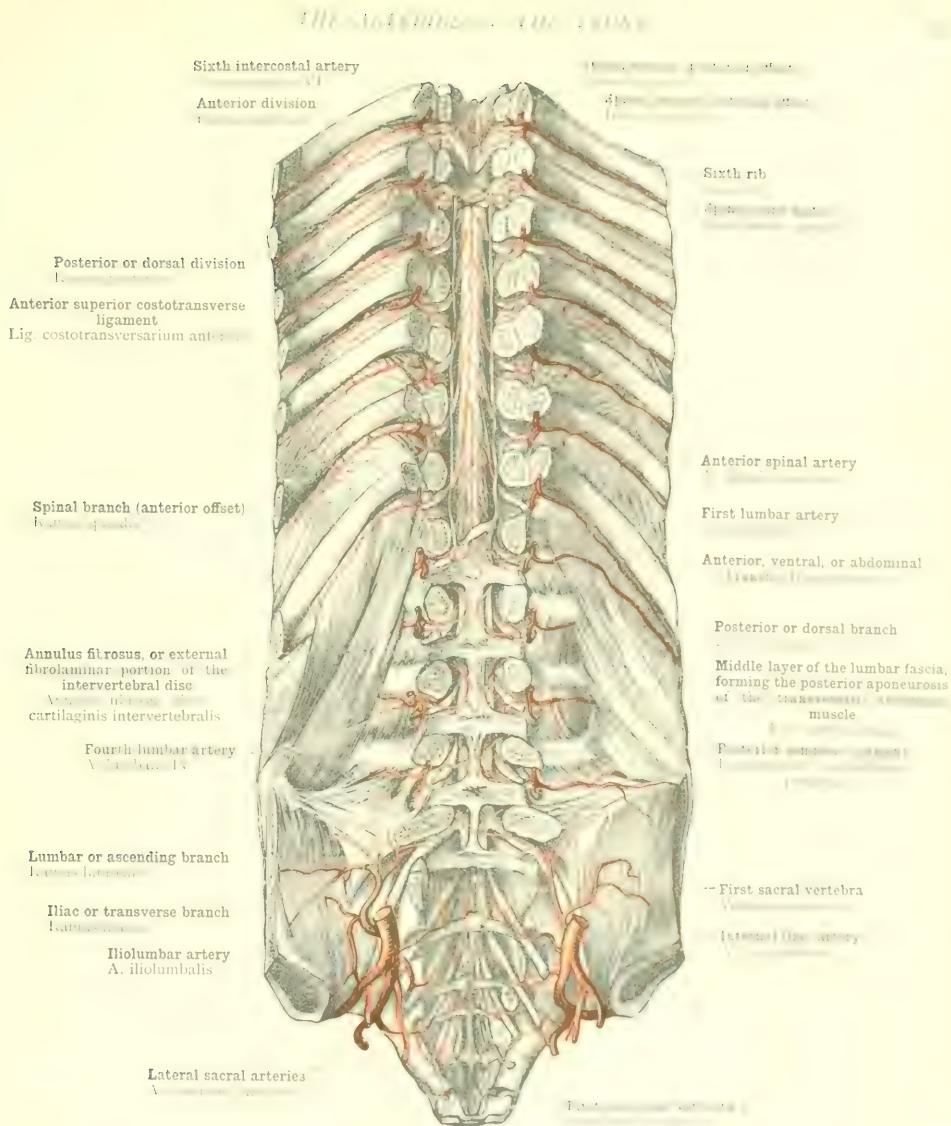


FIG. 361.—PARIETAL BRANCHES OF THE THORACIC AND ABDOMINAL AORTA: THE INTERCOSTAL ARTERIES, THE LUMBAR ARTERIES, AND THE MIDDLE SACRAL ARTERY, OR SACRAL AORTA.

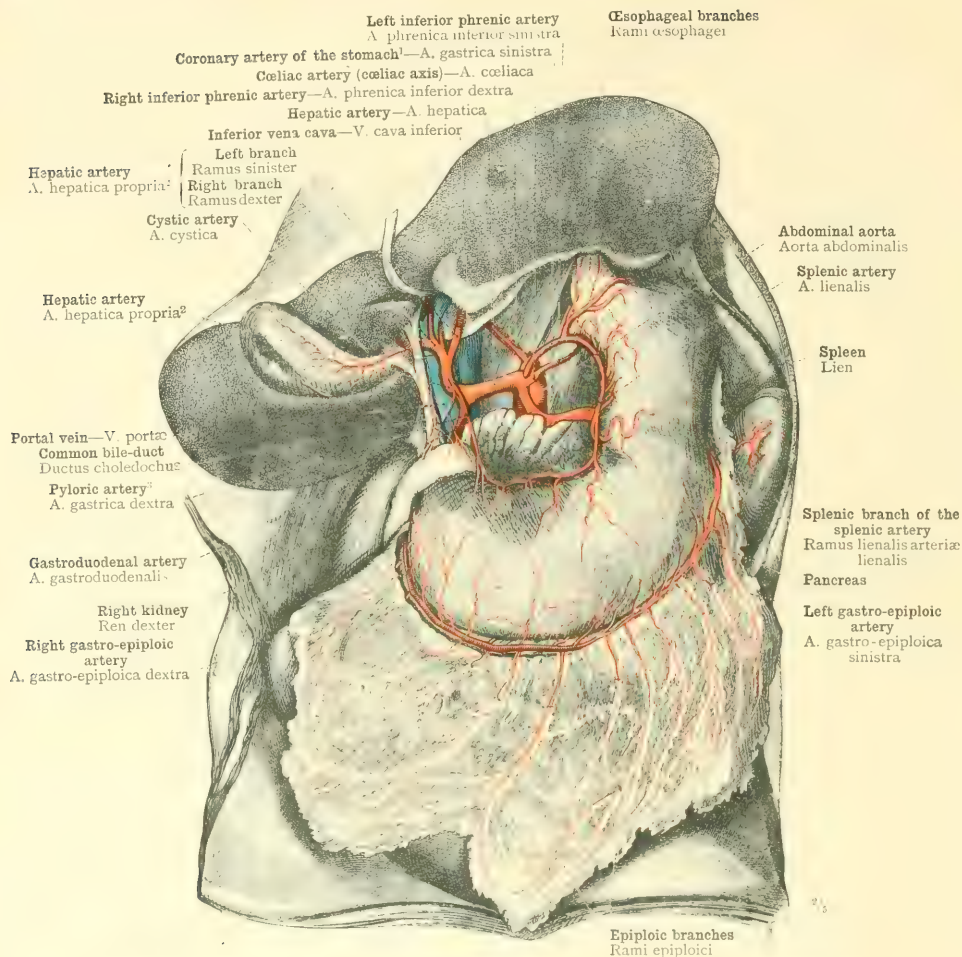
The visceral branches of the aorta, with the exception of the bronchial artery, have been cut away close to their origin.

Arteriæ intercostales et lumbales—The intercostal and lumbar arteries.



The Arteries of the Spinal Canal.





<sup>1</sup> Called by Macalister the *arteria gastrica*.

<sup>2</sup> See Appendix, note 39.

<sup>3</sup> See Appendix, note 39.

FIG. 983.—THE DIVISION INTO THREE BRANCHES OF THE CELIAC ARTERY OR CELIAC AXIS (ARTERIA CELIACA, TRIPUS CELIACUS HALLERI) DISPLAYED FROM BEFORE BY THE REMOVAL OF THE SMALL OR GASTROHEPATIC OMENTUM. THESE BRANCHES ARE: THE CORONARY ARTERY OF THE STOMACH (ARTERIA GASTRICA SINISTRA—GASTRIC ARTERY, ACCORDING TO MACALISTER); THE SPLENIC ARTERY (ARTERIA SPLENICA); AND THE HEPATIC ARTERY (ARTERIA HEPATICA, WHICH DIVIDES INTO THE GASTRODUODENAL ARTERY AND THE \*ARTERIA HEPATICA PROPRIA, THE LATTER GIVING OFF THE PYLORIC ARTERY (ARTERIA GASTRICA DEXTRA—SUPERIOR PYLORIC ARTERY, ACCORDING TO MACALISTER), AND THEN DIVIDING INTO LEFT AND RIGHT HEPATIC ARTERIES *see Appendix, note 39*). THE CYSTIC ARTERY IS DERIVED FROM THE RIGHT HEPATIC ARTERY; THE RIGHT GASTRO-EPIPLOIC ARTERY FROM THE GASTRODUODENAL ARTERY; AND THE LEFT GASTRO-EPIPLOIC ARTERY FROM THE SPLENIC ARTERY. IN THE GREAT OMENTUM, WHICH IS SEEN GUTTING OUT ALL TEN THE EPIC GASTRO-EPIPLOIC ARTERIES. IN THE \*HEPATODUODENAL LIGAMENT *part of the small or gastrohepatic omentum—see Appendix, Part II., and 46*, WE OBSERVE THE MUTUAL RELATIONS OF THE HEPATIC ARTERY, THE HEPATIC VEIN, AND THE COMMON BILE-DUCT. THE LEFT INFERIOR PHRENIC ARTERY IS IN THIS SPECIMEN DERIVED FROM THE CELIAC AXIS (A COMMON VARIETY).

The Asymmetrical Visceral Branches of the Abdominal Aorta.



Coronary artery of the stomach<sup>1</sup>

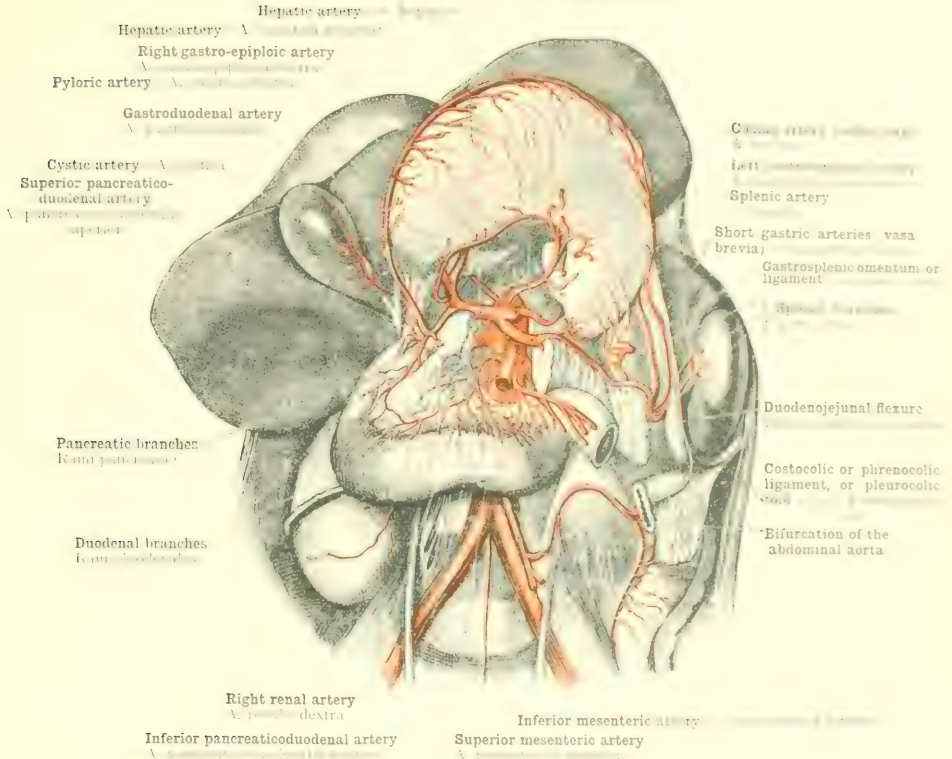
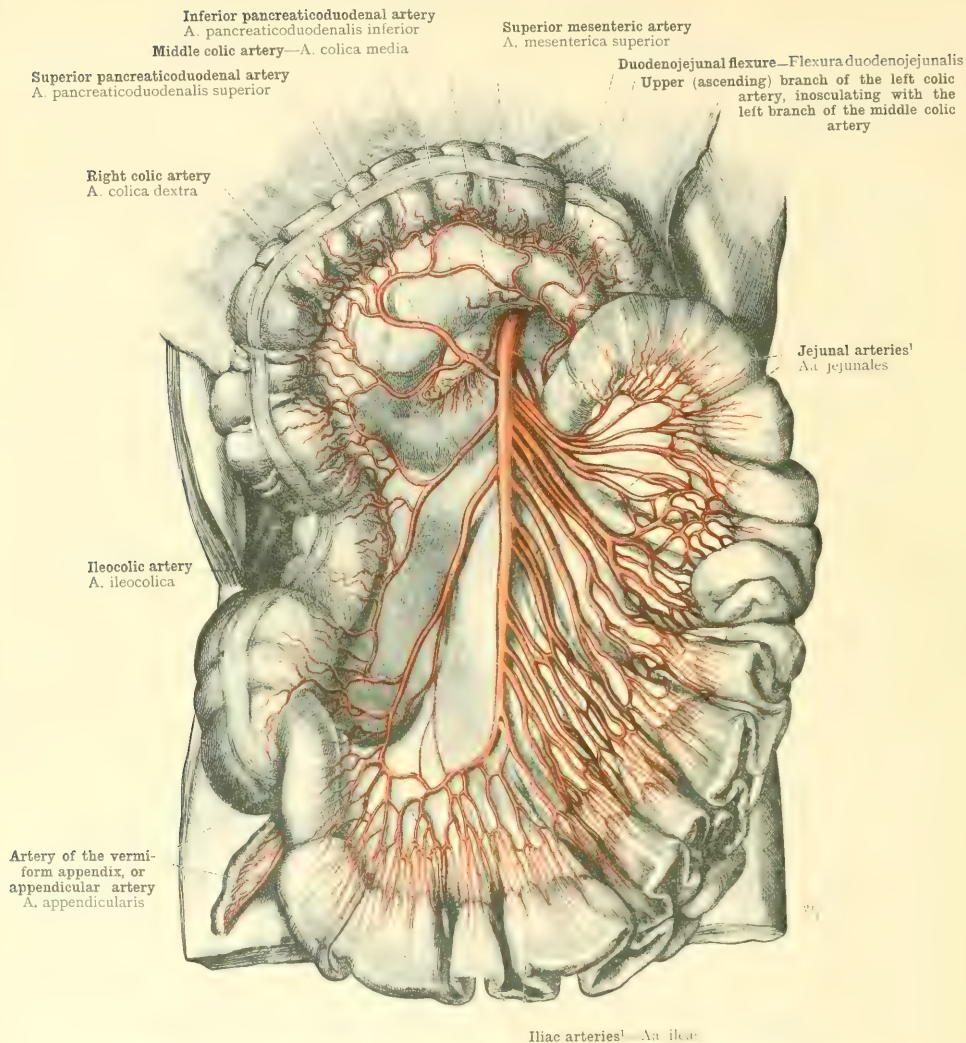


FIG. 684. THE DISTRIBUTION OF THE BRANCHES OF THE ABDOMINAL AORTA. (CUTLER AND ARTHUR CUTLER, THEIR CUTTING HAMILTON, WITH OTHER ILLUSTRATIONS AND SKETCHES. ARTERY, ARTERIA LIGATA; ITS BRANCHES TO THE LIVER AND THE STOMACH, LEFT PANCREATICoduodenal, THE SHORT GASTRIC ARTERIES, AND THE RIGHT GASTRO-EPICLOIC ARTERY, THE LEFT GASTRO-EPICLOIC ARTERY, ARTERIA GASTRO-EPICLOICA DEXTRA; THE BRANCHES OF THE GASTRO-EPICLOIC ARTERY, ARTERIA GASTRO-EPICLOICA SINISTRA; THE PANCREAS AND DUODENAL OMENTUM, PLEUROCOLIC DUCT, DUODENAL, OF THE SUPERIOR AND INFERIOR PANCREATODUODENAL, PLEUROCOLIC, PANCREATODUODENAL, SUPRACOLONIC, AND INFERIOR.

In the posterior view of the abdominal cavity, the branches of the abdominal aorta are also shown. The branches of the abdominal aorta are: the superior mesenteric artery, the inferior mesenteric artery, the right and left renal arteries, the right and left gonadal arteries, the right and left common iliac arteries, the right and left external iliac arteries, and the right and left internal iliac arteries. The branches of the abdominal aorta are also shown in the anterior view of the abdominal cavity.

The Asymmetrical Visceral Branches of the Abdominal Aorta.

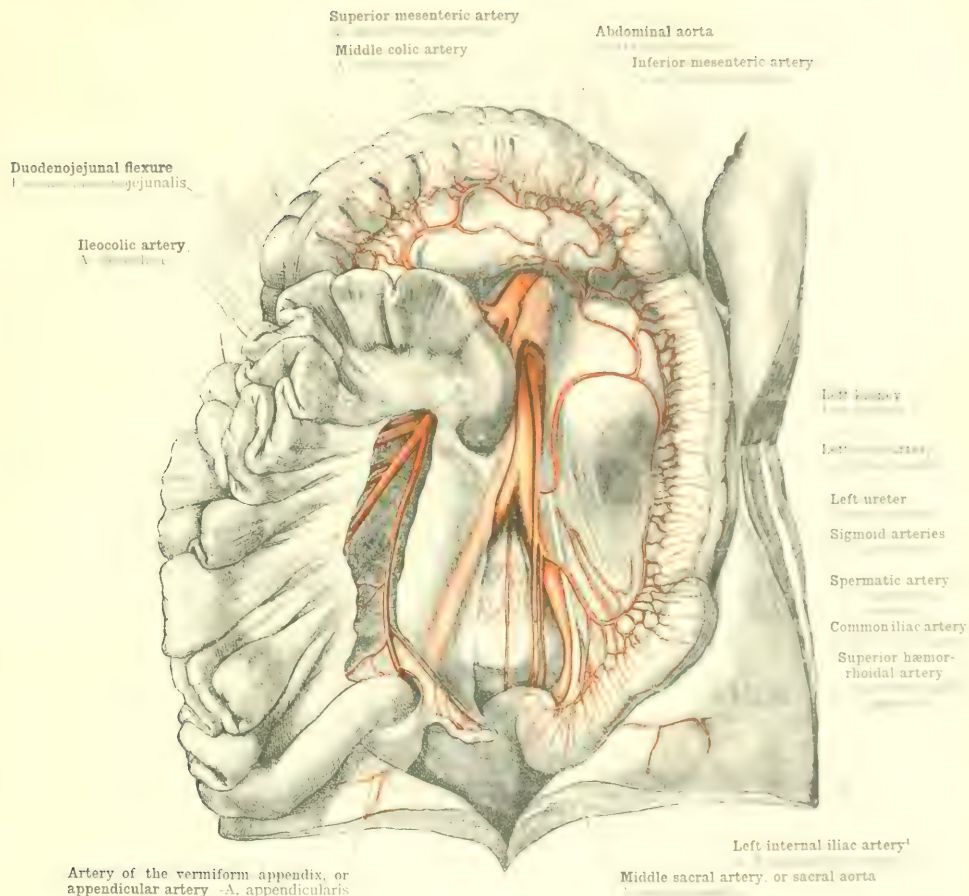


<sup>1</sup> *From the Latin, "arteria"*. Quain calls these originally the "arteries" of the superior mesenteric artery; but Macalister, 1871, calls them "supplied to the" and "of the" mesenteric artery.

FIG. 985.—THE DISTRIBUTION OF THE SUPERIOR MESENTERIC ARTERY, ARTERIA MESENTERICA SUPERIOR. THE INTESTINAL ARTERIES, ARTERIÆ INTESTINALES: SUPERIOR PANCREATICOUDODENAL ARTERY, ARTERIA PANCREATICOUDODENALIS SUPERIOR; JEJUNAL AND ILEAL ARTERIES, ARTERIÆ JEJUNALES ET ILEALES; ILEO-COLIC ARTERY, ARTERIA ILEOCOLICA, GIVING OFF THE ARTERY OF THE VERMIFORM APPENDIX OR APPENDICULAR ARTERY, ARTERIA APPENDICULARIS; THE RIGHT COLIC ARTERY, ARTERIA COLICA DEXTRA; THE MIDDLE COLIC ARTERY, ARTERIA COLICA MEDIA.

The jejunum and ileum with their mesentery have been drawn to the left side; the colon and the transverse mesocolon have been drawn upwards.

### The Asymmetrical Visceral Branches of the Abdominal Aorta.

[illegible]



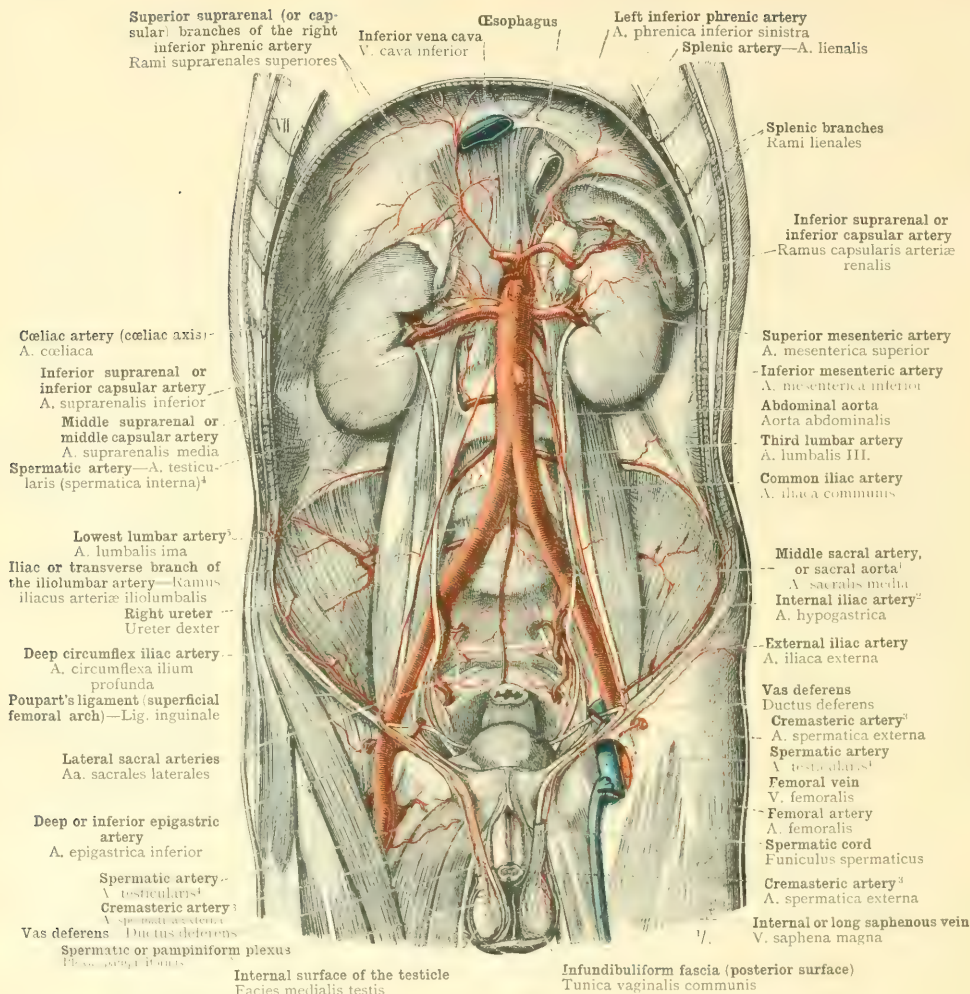
<sup>1</sup> See Appendix, note 1.<sup>2</sup> *Infima Iliaca*. The name is used by the author as a synonym for *arteria spermatica interna*, the spermatic artery of English anatomists. See Appendix, note 3.<sup>3</sup> See Appendix, note 2.<sup>4</sup> See Appendix, note 4.

FIG. 687.—THE PARIETAL BRANCHES AND THE SYMMETRICAL (PAIRED) VISCERAL BRANCHES OF THE ABDOMINAL AORTA: THE INFERIOR PHRENIC OR INFERIOR DIAPHRAGMATIC ARTERIES AND THE LUMBAR ARTERIES; THE MIDDLE SACRAL ARTERY, OR SACRAL AORTA, AND THE LATERAL SACRAL ARTERIES; THE SPLENIC ARTERIES, THE RENAL OR EMERGENT ARTERIES (see p. 595), AND THE SUPRARENAL OR CAPSULAR ARTERIES; THE SPERMATIC ARTERIES (ARTERIE TESTICULARES ET ARTERIE SPERMATICE INTERNE), AND THE CREMASTERIC ARTERIES (ARTERIE SPERMATICE EXTERNE) see Appendix, note 1.

The abdominal viscera were removed, with the exception of the spleen, the kidneys, and the suprarenal capsules (adrenals). After removing the anterior half of the scrotum, the internal surface of the right testicle was laid bare by the removal of its coverings, in order to display the entrance of the spermatic artery into the gland; the left testicle was rotated inwards, in order to show the terminal ramification of the cremasteric artery on the infundibuliform fascia, and between the fasciculi of the cremaster muscle.

The Parietal Branches and the Symmetrical (Paired) Visceral Branches of the Abdominal Aorta.



References: 1. J. H. D. ...

*Lateral inhibition influences processing speed*

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84



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Musculophrenic artery

Musculophrenic artery

Superior epigastric ar

Musculophrenic artery

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The Arteries of the Anterior Wall of the Trunk.

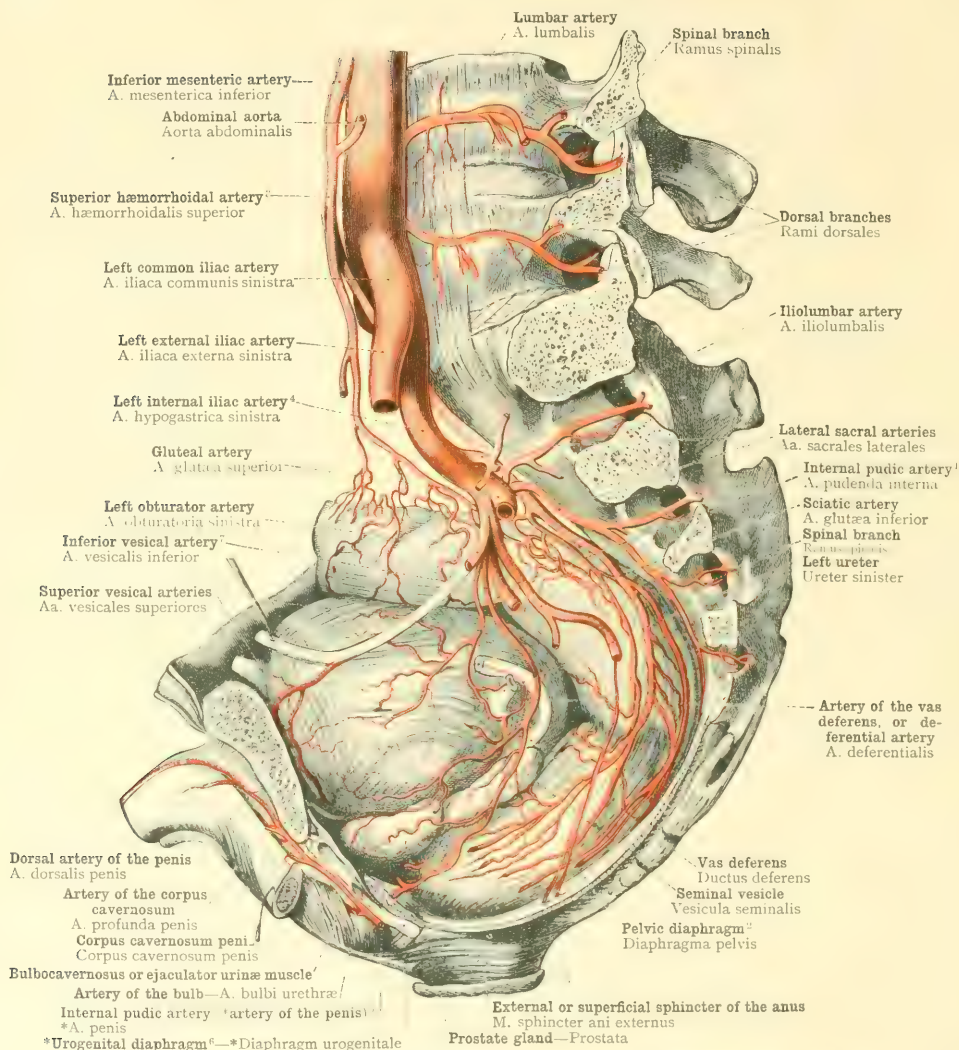
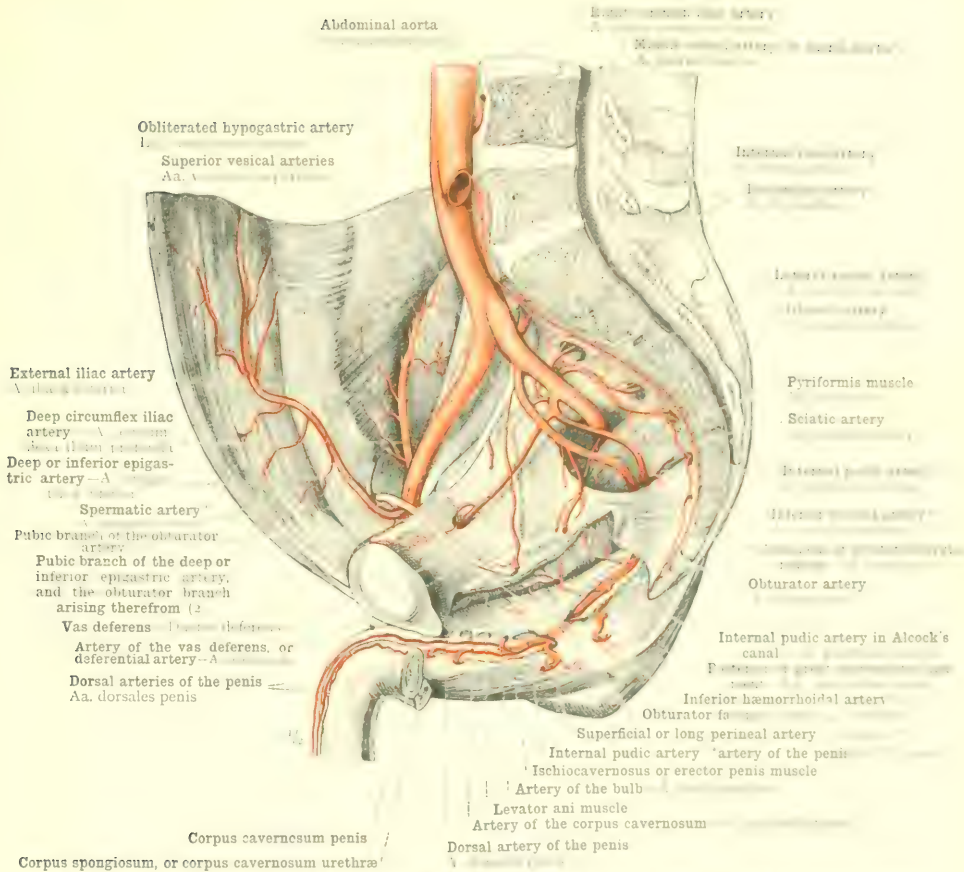


FIG. 989.—THE VISCERAL BRANCHES, RAMI VISCERALES, OF THE INTERNAL ILIAC ARTERY, ARTERIA HYPOGASTRICA (see Appendix, note 120), AS SEEN ON THE LEFT SIDE OF THE MALE PELVIS.

The left innominate bone was sawn through close to the pubic symphysis, and was removed together with the left part of the sacrum; a small part of the left side of the pelvic diaphragm (see Appendix, note 120) was preserved, and was drawn down a little towards the perineum. Further, by the removal of the transverse processes of the fourth and fifth lumbar vertebrae, the dorsal branches of the two lowest lumbar arteries and the lateral sacral arteries were displayed, and their spinal branches (rami spinales) were traced to their entrance into the spinal canal.

### The Arteries of the Male Pelvic Viscera.

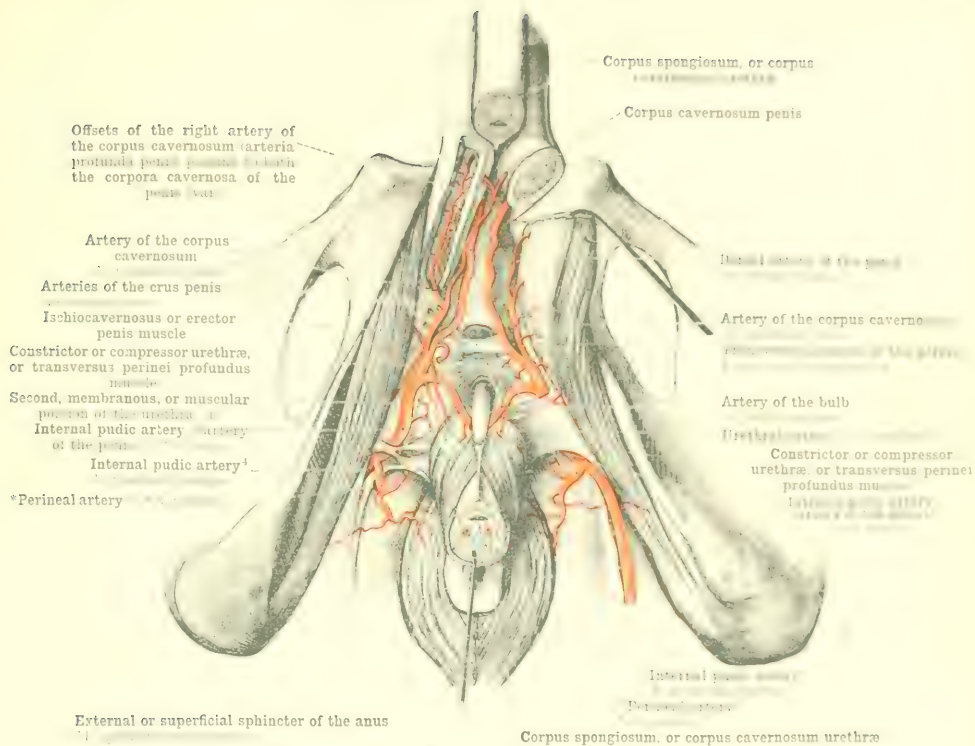


The Arteries of the Lateral Wall of the Pelvis and of the External Genital Organs. The abdominal aorta descends into the pelvis, and divides into the common iliac arteries. The common iliac artery divides into the external and internal iliac arteries. The external iliac artery gives off the superior vesical arteries and the deep circumflex iliac artery. The internal iliac artery gives off the obturator foramen artery, which divides into the anterior and posterior tibial arteries. The internal pudic artery gives off the inferior hemorrhoidal artery and the artery of the bulb. The diagram is labeled with various anatomical structures and arteries.









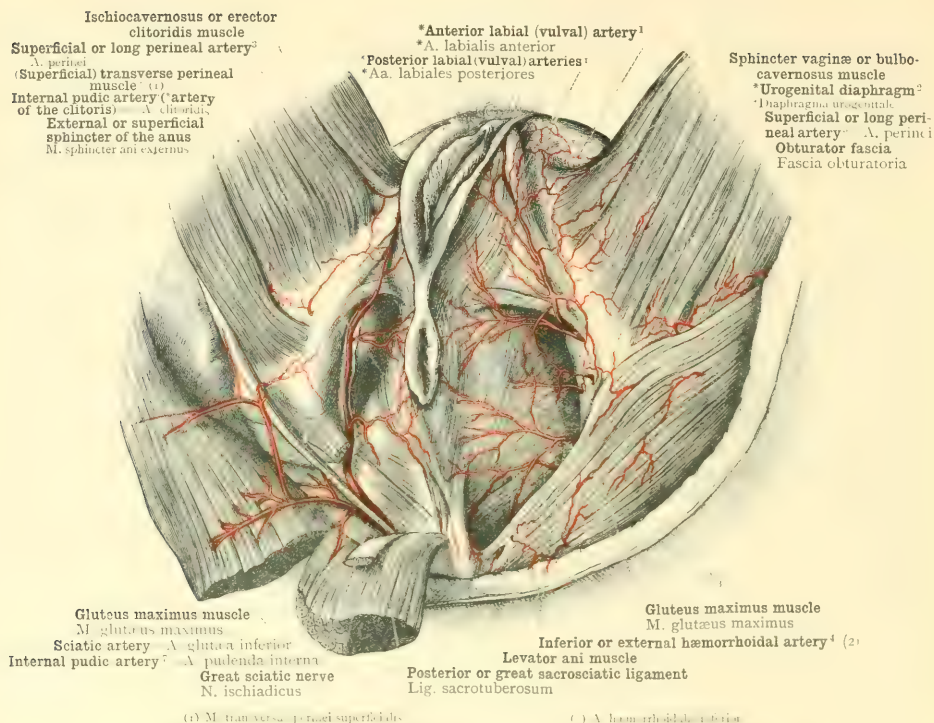
<sup>1</sup> See Appendix, note 135.<sup>4</sup> Called by Macalister the *anal artery*.<sup>7</sup> See Appendix, note 136.<sup>2</sup> See Appendix, note 134.<sup>3</sup> See note 134, — in Part IV.<sup>5</sup> See Appendix, note 137.<sup>6</sup> See Appendix, note 138.

FIG. 993.—THE SUPERFICIAL BRANCHES OF THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, IN THE FEMALE PERINEAL REGION: THE INFERIOR OR EXTERNAL HÆMORRHOIDAL ARTERY (ANAL ARTERY, ACCORDING TO MACALISTER), ARTERIA HÆMORRHOIDALIS INFERIOR, AND THE \*PERINEAL ARTERY (*i.e.*, TRANSVERSE PERINEAL ARTERY AND SUPERFICIAL OR LONG PERINEAL ARTERY—see Appendix, notes 147, 149, and 155), ARTERIA PERINEI, WITH THE TERMINATION OF THE SUPERFICIAL OR LONG PERINEAL ARTERY BY ITS DIVISION INTO THE POSTERIOR LABIAL ARTERIES, ARTERIÆ LABIALES POSTERIORES (see Appendix, note 138).

On the right side of the body the gluteus maximus muscle was partially divided by an incision passing upwards from its lower border, and was turned upwards; the posterior or great sacrospinous ligament, ligamentum sacrotuberosum, was cut completely across, and turned upwards with the gluteus maximus muscle. By the removal of the superficial layer of the obturator fascia where it covers the internal pudic artery in Alcock's canal (see Appendix, note 145), that canal was opened throughout, and the artery was exposed from its point of emergence from the pelvis to the point at which it perforates the base of the triangular ligament (or, in the author's terminology, to the point at which it enters the \*urogenital diaphragm—see Appendix, note 146).

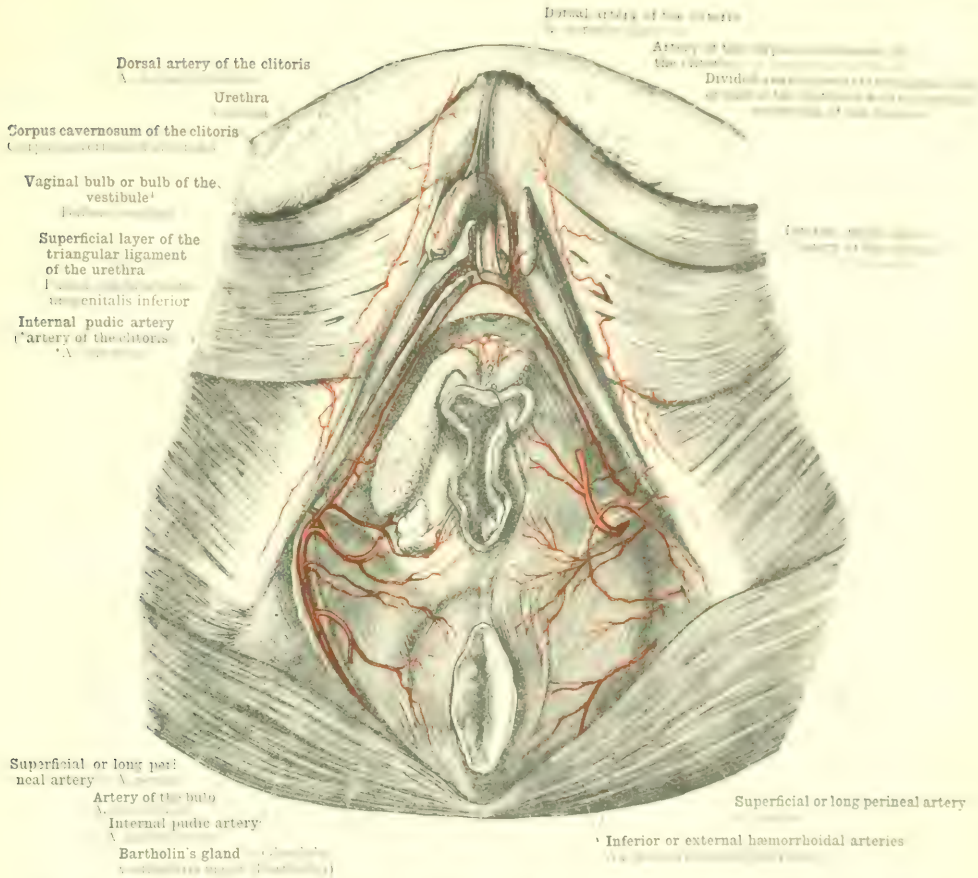


FIG. 101. THE ARTERIES OF THE FEMALE PERINEAL REGION. The diagram shows the arterial system of the female perineal region. The internal pudic artery, which is a branch of the external iliac artery, enters the perineal region through the greater sciatic foramen. It divides into the dorsal artery of the clitoris, the artery of the bulb, and the superficial perineal artery. The superficial perineal artery further divides into the inferior and superior haemorrhoidal arteries. The diagram also shows the vaginal bulb, the corpus cavernosum of the clitoris, and Bartholin's gland.



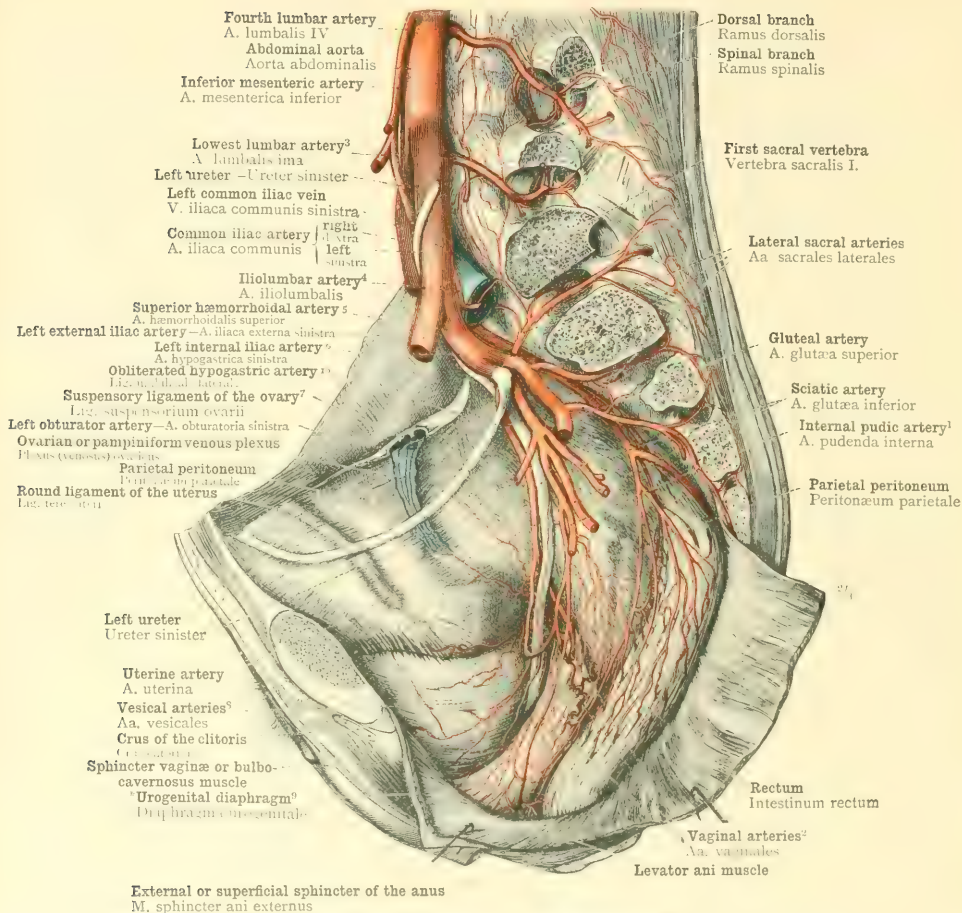
<sup>1</sup> See Appendix, note 161.<sup>2</sup> See Appendix, note 162.<sup>3</sup> See Appendix, note 163.<sup>4</sup> See Appendix, note 164.<sup>5</sup> See Appendix, note 165.<sup>6</sup> See Appendix, note 166.<sup>7</sup> See Appendix, note 167.<sup>8</sup> See Appendix, note 168.<sup>9</sup> See Appendix, note 169.<sup>10</sup> See Appendix, note 170.<sup>1</sup> See Appendix, note 161.<sup>2</sup> See Appendix, note 162.<sup>3</sup> See Appendix, note 163.<sup>4</sup> See Appendix, note 164.<sup>5</sup> See Appendix, note 165.<sup>6</sup> See Appendix, note 166.<sup>7</sup> See Appendix, note 167.<sup>8</sup> See Appendix, note 168.<sup>9</sup> See Appendix, note 169.<sup>10</sup> See Appendix, note 170.<sup>1</sup> See Appendix, note 161.<sup>2</sup> See Appendix, note 162.<sup>3</sup> See Appendix, note 163.<sup>4</sup> See Appendix, note 164.<sup>5</sup> See Appendix, note 165.<sup>6</sup> See Appendix, note 166.<sup>7</sup> See Appendix, note 167.<sup>8</sup> See Appendix, note 168.<sup>9</sup> See Appendix, note 169.<sup>10</sup> See Appendix, note 170.

FIG. 995.—THE LEFT INTERNAL ILIAC ARTERY, ARTERIA HYOAGASTRICA (see Appendix, note 120), AND ITS VISCERAL BRANCHES, RAMI VISCERALES, SEEN IN THE SUBPERITONEAL SPACE OF A FEMALE PELVIS: THE LOWEST OFFSETS OF THE SUPERIOR HÆMORRHOIDAL OR SUPERIOR RECTAL ARTERY, ARTERIA HÆMORRHOIDALIS SUPERIOR; THE UTERINE ARTERY, ARTERIA UTERINA, AS FAR AS ITS POINT OF ENTRANCE INTO THE BROAD LIGAMENT OF THE UTERUS (MESOMETRIUM); THE VAGINAL ARTERIES, ARTERIE VAGINALES (see Appendix, note 160); THE TERMINAL OFFSETS TO THE BLADDER, ARTERIE VESICALES (see Appendix, note 162), AND TO THE URETER. OF THE PARIETAL BRANCHES, RAMI PARIETALES, THE LATERAL SACRAL ARTERIES, ARTERIE SACRALES LATERALES, AND THE TWO LOWERMOST LUMBAR ARTERIES, ARTERIE LUMBALES, HAVE BEEN PRESERVED; THE SPINAL BRANCHES HAVE BEEN TRACED UP TO THEIR ENTRANCE INTO THE SPINAL CANAL.

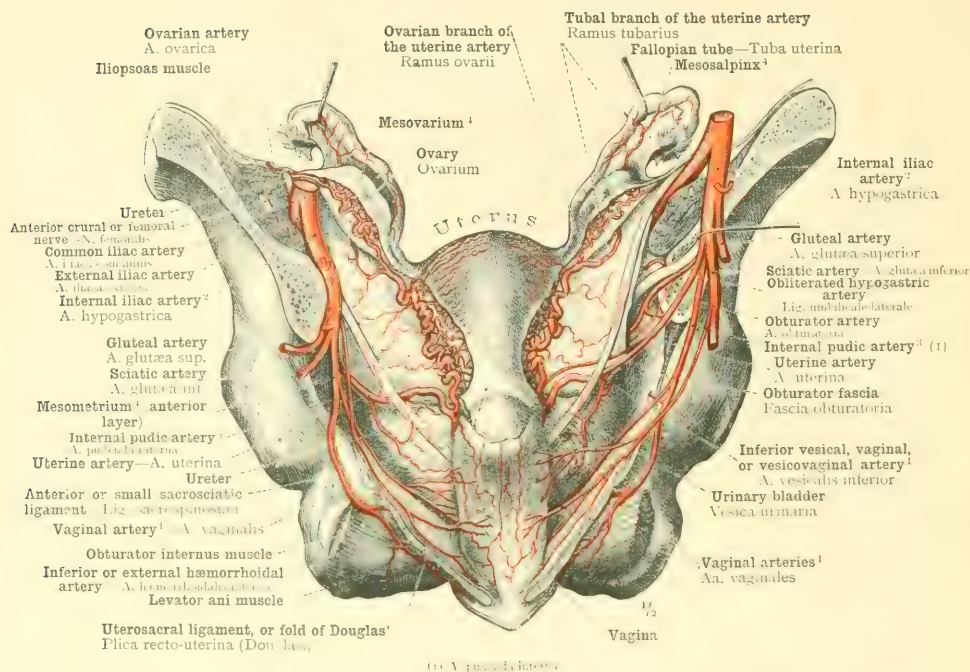
The left lateral wall of the pelvis was removed by a section which in front passed close to the median plane, and behind, through the left row of sacral foramina; but the parietal peritoneal investment of this wall was preserved up to its reflection on to the urinary bladder, the vagina, and the rectum. The parts of these organs situate outside the peritoneum were laid bare, and the pelvic diaphragm (see Appendix, note 140) was turned downwards.

### The Arteries of the Female Pelvic Viscera.





The Arteries of the Female Pelvic Viscera.



1 See Appendix, note 103. 2 See Appendix, note 103. 3 See Appendix, note 103. 4 See Appendix, note 103. 5 Called by Meckel, "arteria sacrospinosa." 6 Known as "arteria sacrospinosa" by Meckel. 7 Called by Meckel, "arteria sacrospinosa." See Appendix, note 103.

FIG. 997.—THE ARTERIES OF THE UTERUS, THE OVARIES, THE FALLOPIAN TUBES, THE VAGINA, AND THE URINARY BLADDER, SEEN FROM BEHIND: THE OVARIAN ARTERY, ARTERIA OVARICA (ARTERIA SPERMATICA INTERNA); THE UTERINE ARTERY, ARTERIA UTERINA, WITH ITS OFFSETS TO THE OVARY (RAMUS OVARI), THE FALLOPIAN TUBE (RAMUS TUBARIUS), THE VAGINA ARTERIÆ VAGINALES—see Appendix, note 103, AND TO THE BLADDER (ARTERIA VESICALIS INFERIOR)—*i.e.*, THE INFERIOR VESICAL, VAGINAL, OR VESICOVAGINAL ARTERY (IN THIS SPECIMEN ARISING FROM THE UTERINE ARTERY, INSTEAD OF, AS USUALLY, ARISING SEPARATELY FROM THE ANTERIOR DIVISION OF THE INTERNAL ILIAC ARTERY—see Appendix, note 103); THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, AND ITS OFFSETS TO THE VAGINA (see Appendix, note 103). THE PELVIC PORTION OF THE URETER, AND ITS RELATIONS TO THE UTERINE ARTERY, THE CERVIX UTERI, THE VAGINA, AND THE URINARY BLADDER.

By a frontal section passing on each side through the great sacroscopic foramen, the posterior wall of the pelvis was removed, in order to display (after removing the rectum) the uterus and the vagina, and, in addition, the lateral parts of the bladder. The uterus and the vagina were drawn upwards, the ovaries upwards and forwards; the lower layer of the mesovarium and the hinder layer of the mesometrium were removed, and the ureters, thus exposed, were preserved as nearly as possible in their natural position. The right internal iliac artery was drawn outwards and backwards, to display more fully the origin of its branches and that of the obliterated hypogastric artery (see note 1 above). The branches of the posterior division of the artery have been cut away near their origin, and the internal pudic artery has on both sides been traced as far as its passage through the small sacroscopic foramen.

### The Arteries of the Female Pelvic Viscera.

ARTERIÆ COLLI ET CAPITIS

THE ARTERIES OF THE HEAD  
AND NECK

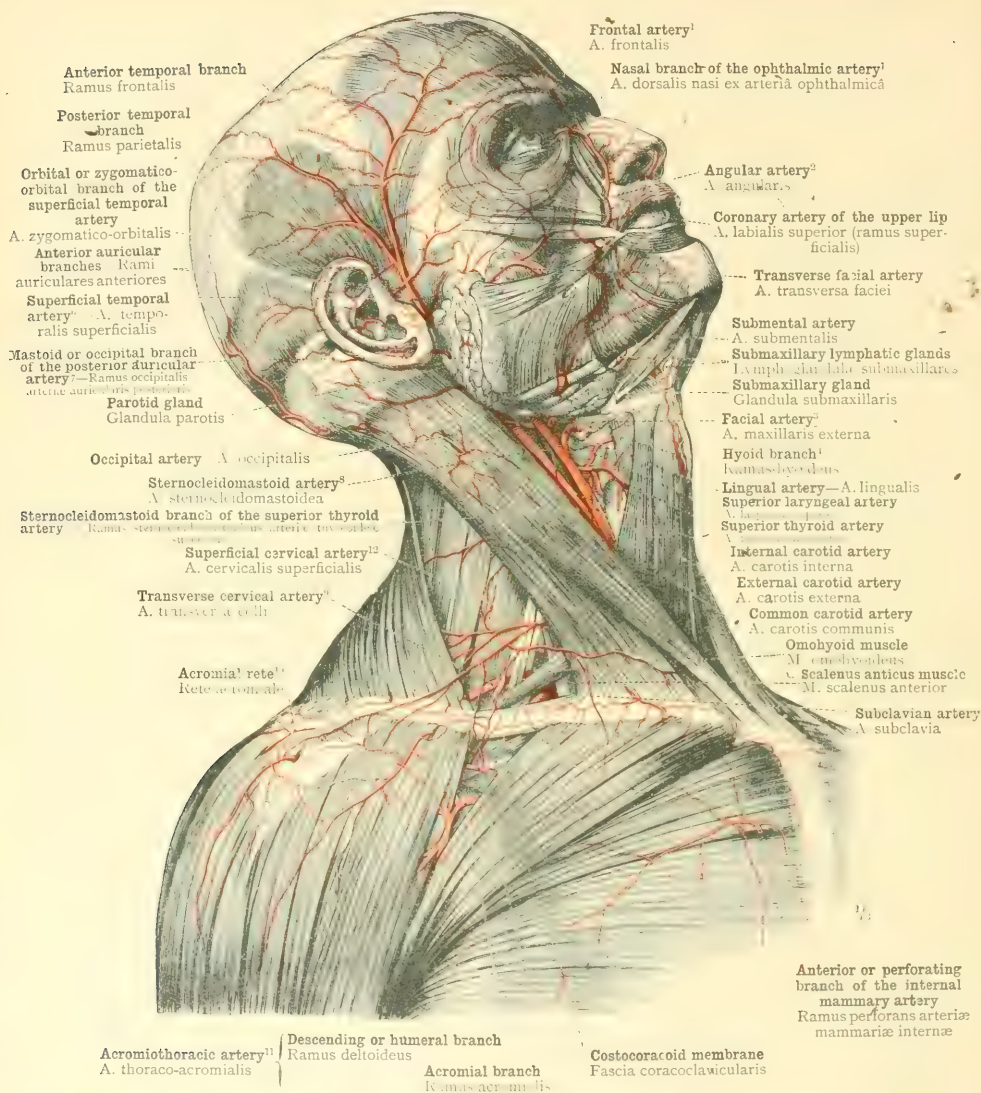
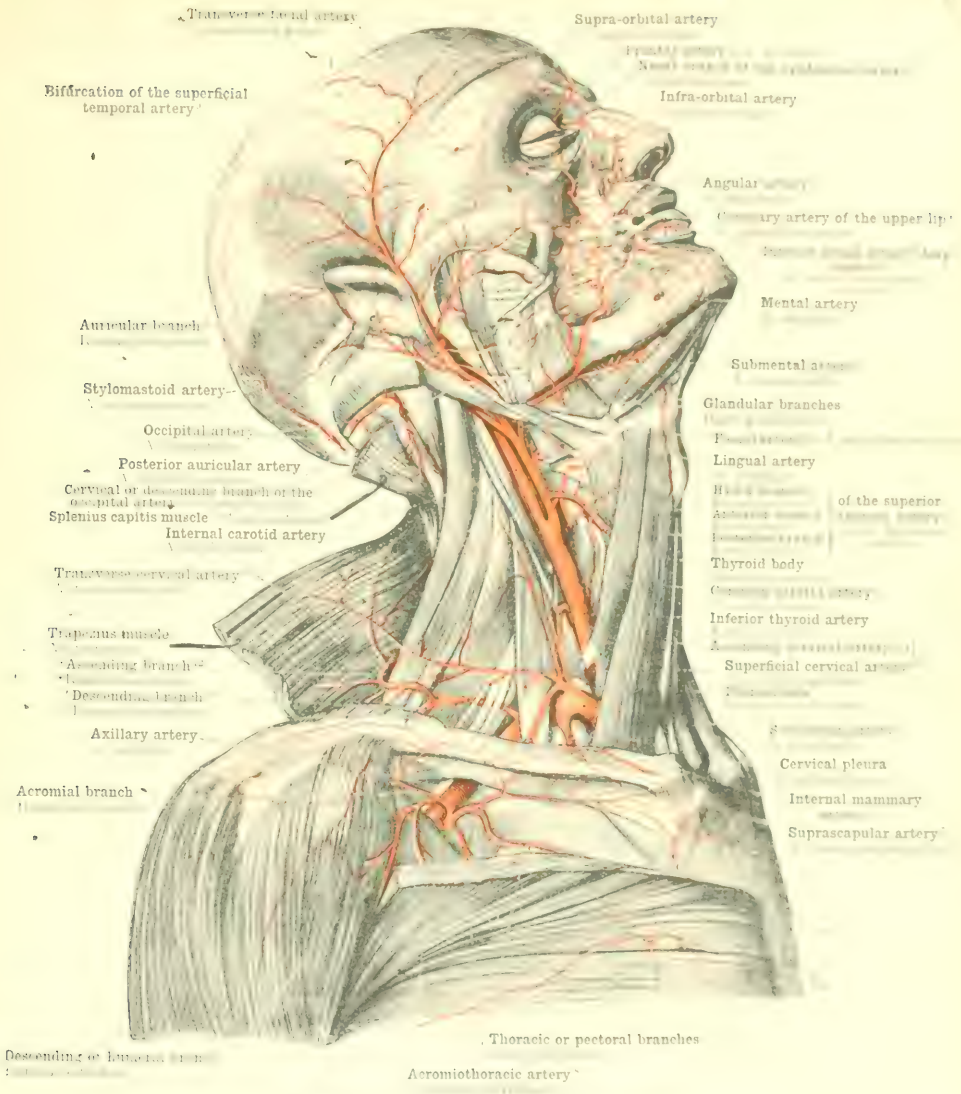


FIG. 998. —SUPERFICIAL ARTERIES OF THE HEAD AND NECK, AND OF THE UPPER PART OF THE PECTORAL REGION AND THE SHOULDER: SEEN FROM THE RIGHT SIDE.

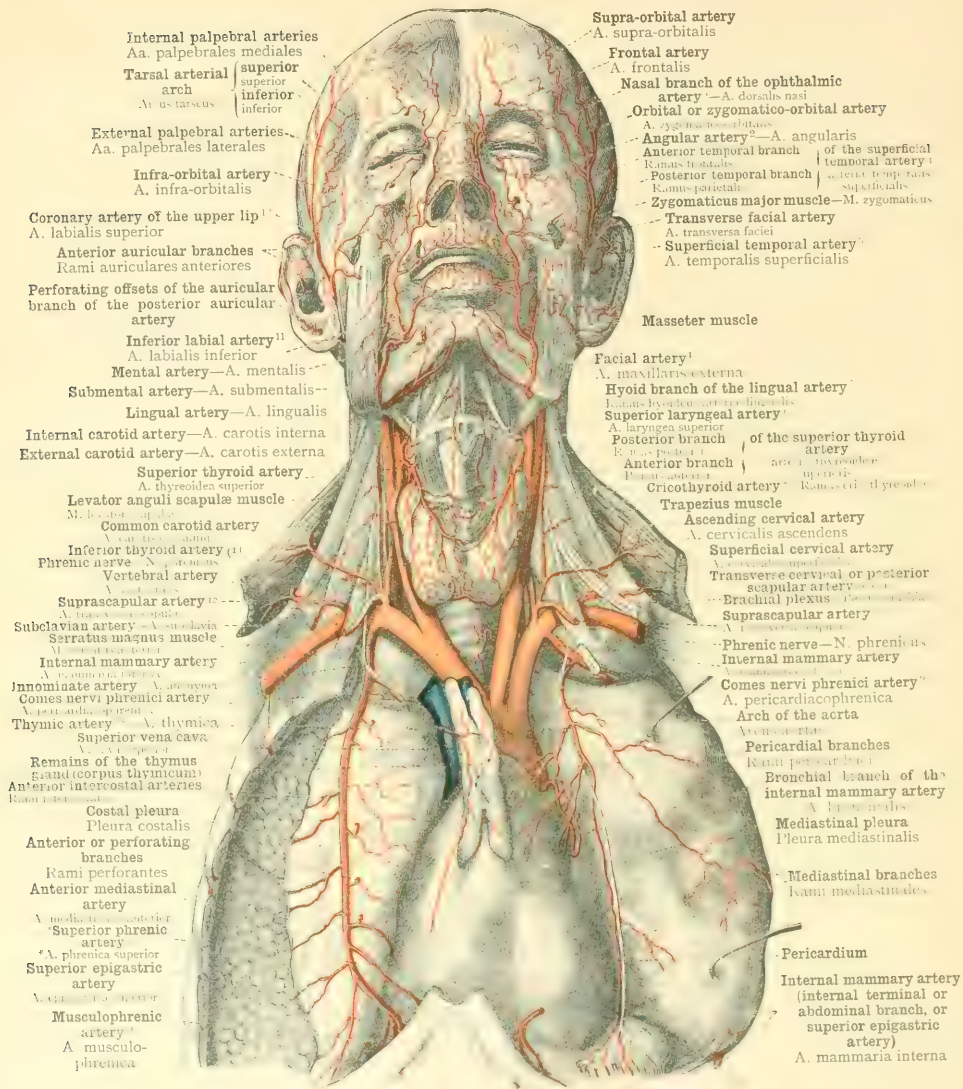
On the interior part of the parotid gland, the parotid duct and its artery have been left intact. The lower ends of the levator labii superioris alæque nasi, levator labii superioris propius, and zygomaticus minor muscles have been removed, to display the facial artery and the origin of the coronary artery of the upper lip.





Descending or humeral artery

Acromiothoracic artery



C. A. Thyroid artery.

C. A. Transverse artery.

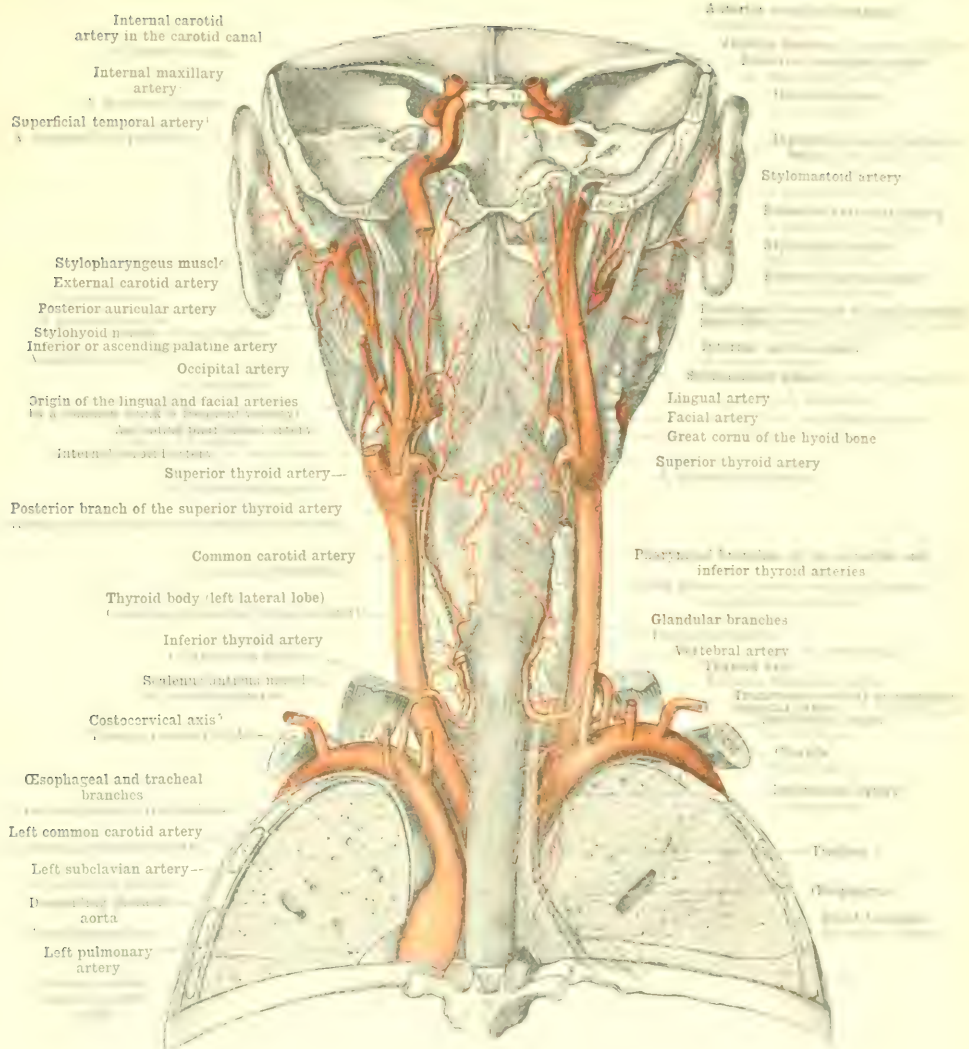
1 See Appendix, note 1.  
2 See Appendix, note 2.  
3 See Appendix, note 3.  
4 See Appendix, note 4.

5 See Appendix, note 5.  
6 See Appendix, note 6.  
7 See Appendix, note 7.  
8 See Appendix, note 8.

9 See Appendix, note 9.  
10 See Appendix, note 10.  
11 See Appendix, note 11.  
12 See Appendix, note 12.

FIG. 1000.—ON THE RIGHT SIDE OF THE BODY, THE COSTAL PLEURA AND THE LUNG HAVE BEEN PUSHED SOMEWHAT BACKWARD; AND BETWEEN THE INTERNAL MAMMARY ARTERY AND THE ANTERIOR CUT SURFACES OF THE RIBS THE COSTAL PLEURA HAS BEEN REMOVED, EXPOSING THE SURFACE OF THE LUNG. THE LEFT LAYER OF THE MEDIASTINUM HAS BEEN SEPARATED FROM ITS ATTACHMENTS AS FAR BACK AS THE ROOT OF THE LUNG, AND HAS BEEN DRAWN OUTWARDS WITH THAT ORGAN.

The Distribution of the Branches of the Arch of the Aorta in the Head and Neck, and the Distribution of the Internal Mammary Artery.



*Arteria subclavia*, the subclavian artery; *Arteria carotis externa*, the common carotid artery; *Arteria carotis interna*, the internal carotid artery; the *Arteria* of the *trachea*, the trachea, and the *oesophagus*.



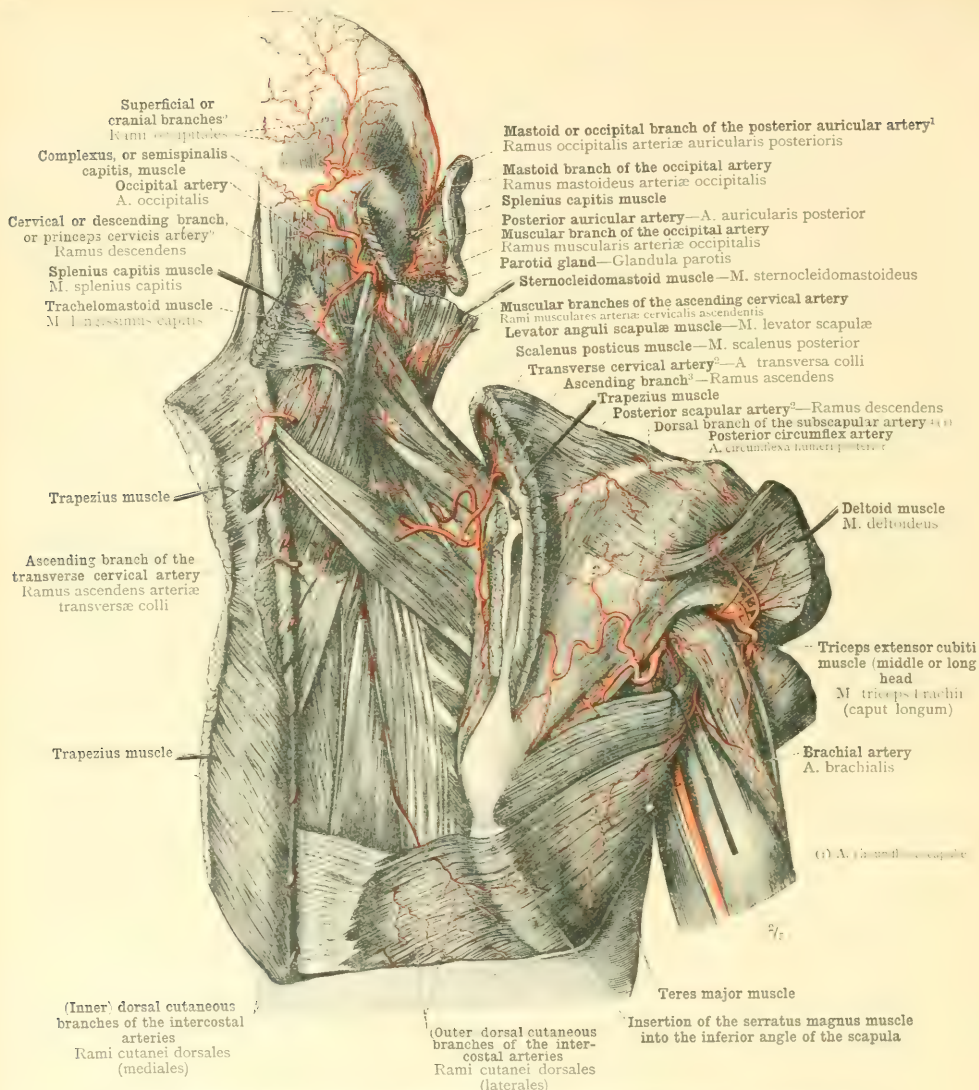


FIG. 1002.—THE DEEP ARTERIES OF THE RIGHT NUCHAL REGION AND THE BACK OF THE RIGHT SHOULDER; SEEN FROM BEHIND.

The scapula was drawn a little away from the trunk; a horizontal incision was made through the posterior half of the deltoid muscle a little above the middle of its vertical extent, and the muscle was turned forwards; the teres major muscle was drawn somewhat downwards. The superficial offsets only of the dorsal branch of the subscapular artery (dorsalis scapulae artery—arteria circumflexa scapulae) are seen, on the surface of the infraspinatus muscle; the deeper branches of this artery, ramifying beneath the infraspinatus muscle, are shown in Fig. 1010.

Arteria occipitalis, the occipital artery; arteria transversa colli, the transverse cervical (or posterior scapular) artery; arteria circumflexa scapulae, the dorsal branch of the subscapular or dorsalis scapulae artery; and arteria circumflexa humeri posterior, the posterior circumflex artery (of the arm).



Cervical or descending  
branch, or princeps cervicis artery

Posterior meningeal artery\*  
verte

Mastoid branch

Occipital artery - A

Vertebral artery - A. verte

Transverse process of the  
atlas

Posterior belly of the digastric  
muscle  
culi di

Levator anguli scapulae  
muscle

Complexus, or semi-  
spinalis capitis, muscle

Semispinalis colli muscle

Spinous process of the seventh cervical  
vertebra (vertebra prominens)

Deep cervical artery  
A. cervicalis p.

Transverse cervical artery  
A. cervicalis t.

Semispinalis dorsi muscle

Aur

Complexus, or semi-

Posterior or dorsal branch of the  
superior intercostal artery

\*Descending branch

Longissimus dorsi muscle

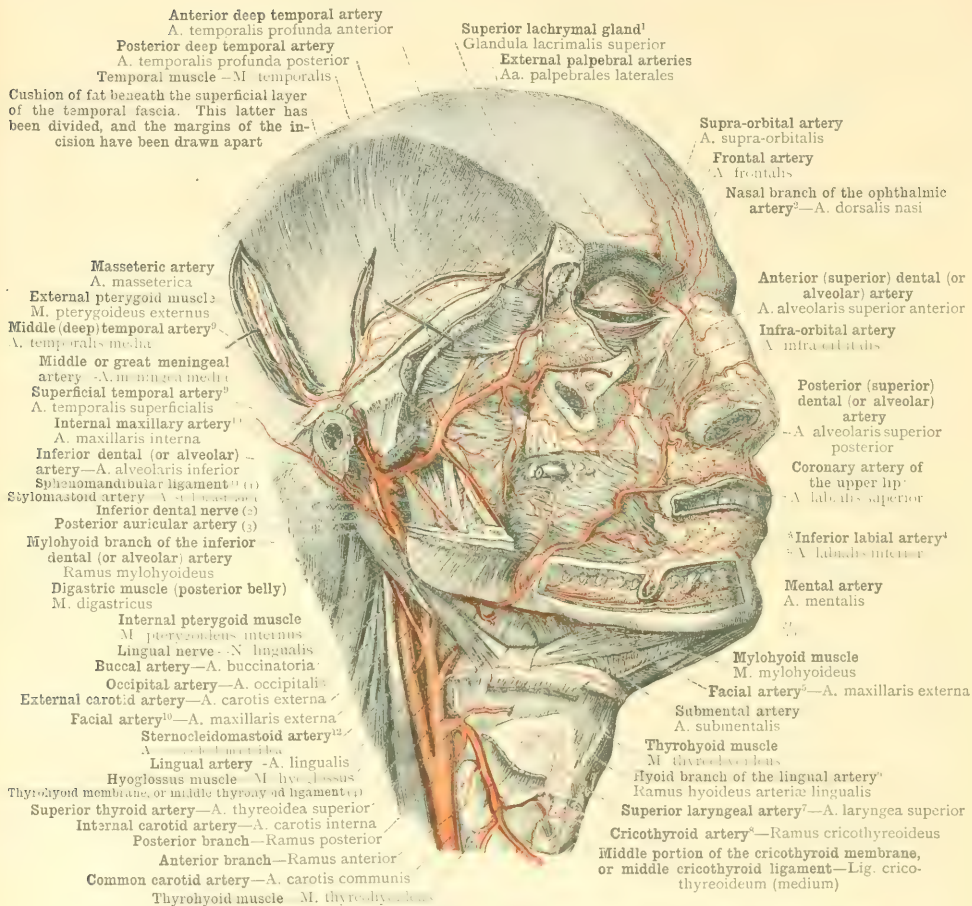
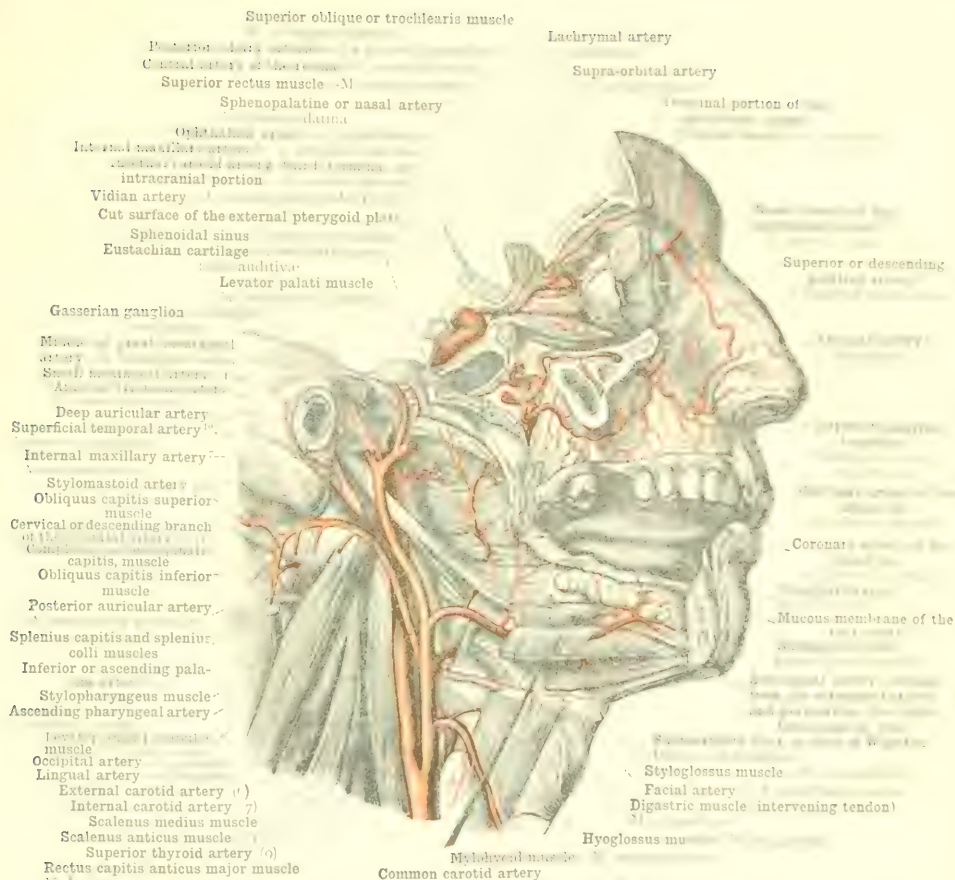


FIG. 1054. THE ARTERIES OF THE LOWER PART OF THE FRONT OF THE NECK, OF THE RETROMANDIBULAR FOSSA (FOSSA RETROMANDIBULARIS), AND OF THE ZYGOMATIC FOSSA (FOSSA INFRATEMPORALIS); SEEN FROM THE RIGHT SIDE.

In the preparation shown in Fig. 999, the pinna or auricle was cut away, and the superficial temporal artery was removed down the point at which it crossed the deep temporal vessels. The greater part of the masseter muscle, and the ramus of the mandible was cut away from the neck to below the middle of its vertical extent, the sphenomandibular ligament or internal lateral ligament of the temporomaxillary articulation, however, being left intact. The anterior portion of the outer wall of the orbit was removed, the orbital periosteum being preserved; the upper segment of the temporal muscle was drawn upwards; and the superficial layer of the temporal fascia having been incised and the margins of the incision having been drawn apart, the cushion of fat beneath this superficial layer, and the anterior division of the middle (deep) temporal artery, were exposed; the posterior division of this artery was exposed by an incision through the temporal fascia and the temporal muscle. The thyrohyoid muscle was for the most part removed, in order to lay bare the superior laryngeal artery perforating the thyrohyoid membrane or middle thyrohyoid ligament.

Arteria maxillaris interna—The internal maxillary artery.



A. maxillaris interna, the internal maxillary artery; a. ophthalmica, the ophthalmic artery; a. pharyngea ascendens, the ascending pharyngeal artery; a. palatina ascendens, the inferior or ascending palatine artery; a. sublingualis, the sublingual artery.



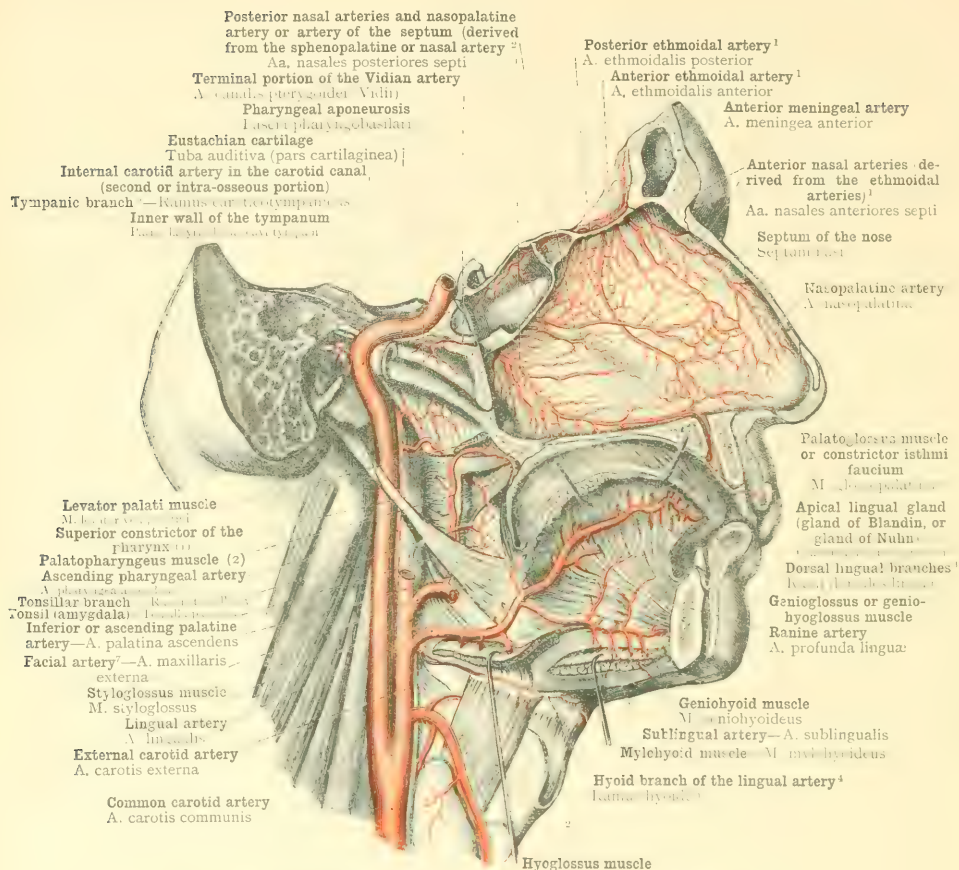


FIG. 1006.—ARTERIES OF THE NASAL SEPTUM, THE TONGUE, AND THE PHARYNX; SEEN FROM THE RIGHT SIDE.

In the preparation shown in Fig. 1006, by a sagittal section passing a little to the right of the median plane, the right side of the septum of the nose was exposed; by a section somewhat further to the right, the lower part of the internal pharyngeal arch was removed, and the Velum, pharyngeal canal, and uvula were exposed, and the posterior orifice. By means of a section passing through the temporal bone itself, the direction of which was nearly that of the axis of the petrous portion of the temporal bone, the middle ear was opened, and also the carotid canal, by the removal of its outer wall. The posterior extremity of the Eustachian cartilage was cut away, the levator palati muscle was removed just above the point at which it enters the soft palate, and the pharyngeal aponeurosis was laid bare down to the upper border of the superior constrictor of the pharynx. By the removal of the anterior portion of this muscle, the outer surface of the tonsil (amygdala) was exposed. By the partial removal of the hyoglossus muscle and by drawing its lower segment downwards, the lingual artery was laid bare; and by the partial removal of the intrinsic muscular substance of the tongue, the ranine artery was brought into view.

Arteries of the septum of the nose. A. lingualis, the lingual artery. Aa. pharyngea et palatina ascendens, the ascending pharyngeal and ascending palatine arteries. A. carotis interna, the internal carotid artery.



Posterior external nasal arteries

A. posterior externa, A. posterior interna

Posterior ethmoidal artery

Sphenopalatine artery  
Posterior nasal branch  
Artery of the septum?

Vidian artery

Eustachian cartilage

Middle nasal artery

Internal maxillary artery

Internal maxillary artery

Posterior meningeal artery

Meningeal branch of the vertebral artery

Occipital artery

Posterior auricular artery

Inferior dental or alveolar artery

Mylohyoid branch

Stylopharyngeus muscle

Styloglossus muscle

Tonsillar branch

Inferior or ascending palatine artery

Occipital artery

Mylohyoid branch of the inferior

dental or alveolar artery

Ascending pharyngeal artery

Internal carotid artery

External carotid artery - A

Carotid gland or glomus caroticum

Common carotid artery - A. carotis communis

palatine artery

Great auricular artery

Anterior auricular artery

Superior thyroid artery

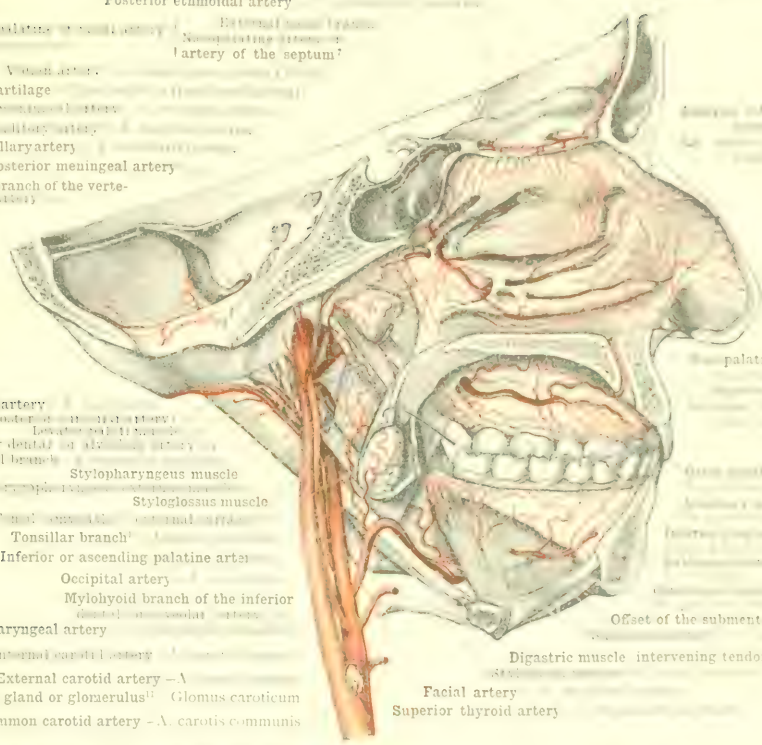
Offset of the submental artery

Offset of the submental artery

Digastric muscle intervening tendon

Facial artery

Superior thyroid artery



Arteries of the external wall of the nasal fossae: A. pterygopalatina, the superior palatine artery, A. carotis interna, the Vidian artery, A. pharyngea ascendens, the ascending pharyngeal and the inferior or ascending palatine artery.

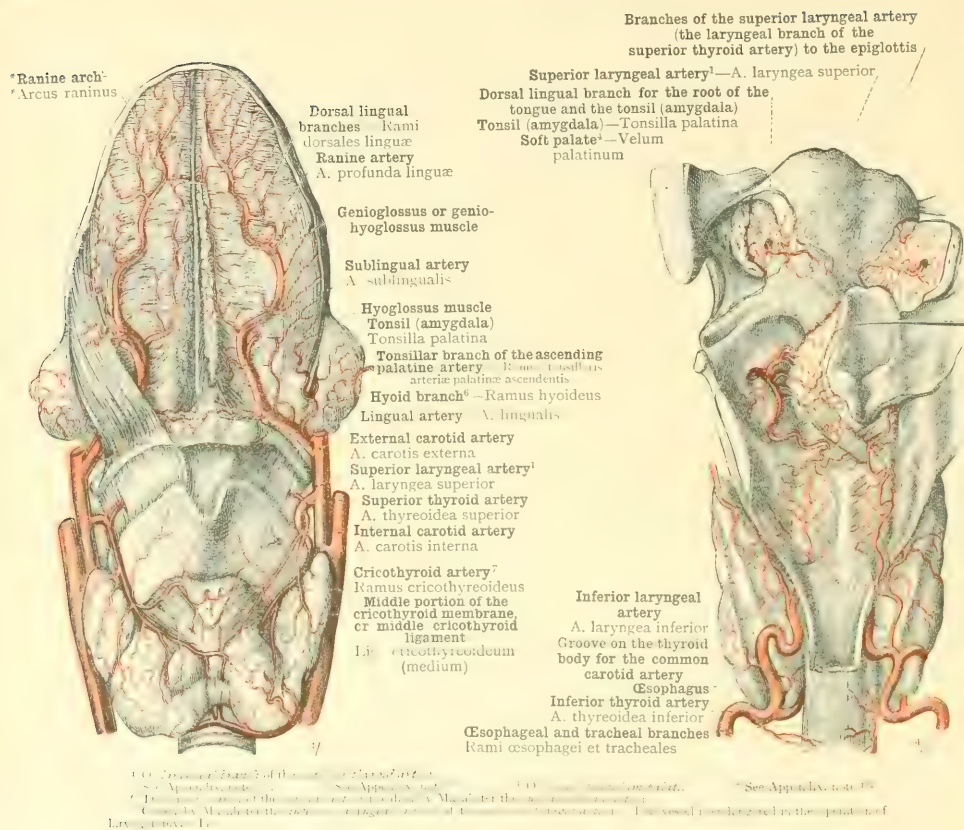


FIG. 1008.—THE TONGUE, THE LARYNX, AND THE THYROID BODY, SEEN FROM THE VENTRAL SIDE. THE RAMIFICATION OF THE RANINE ARTERY, A. PROFUNDA LINGUÆ, AND THE TRANSVERSE ANASTOMOSIS BETWEEN THE TWO RANINE ARTERIES, KNOWN AS THE RANINE ARCH (ARCUS RANINUS), ARE PRESERVED; THE LINGUAL ARTERY, A. LINGUALIS, WITH ITS HYOID BRANCH, RAMUS HYOIDEUS (see note <sup>6</sup> above); THE TONSIL (AMYGDALA), TONSILLA PALATINA; THE SUPERIOR THYROID ARTERY, A. THYROIDEA SUPERIOR, WITH THE SUPERIOR LARYNGEAL ARTERY, A. LARYNGEA SUPERIOR, AND THE CRICOTHYROID ARTERY, RAMUS CRICOTHYROIDEUS.

Left: except that the tongue, the hyoglossus muscle has been preserved; in the left half it has been removed, and the left carotid artery has thus been fully exposed. The sublingual artery, arteria sublingualis, has been cut away on both sides close to its origin; the dorsal lingual branches have been traced to a considerable distance in the partial removal of the tongue muscle and sublingual gland.

FIG. 1009.—THE ROOT OF THE TONGUE, THE LARYNX, AND THE LARYNGEAL PORTION OF THE PHARYNX, WITH THE ADJOINING PORTION OF THE ESOPHAGUS AND THE THYROID BODY; SEEN FROM THE DORSAL SIDE.

After the posterior wall of the pharynx had been removed, the mucous membrane covering the left pyriform sinus and the anterior wall of the pharynx as far down as the commencement of the esophagus was dissected off, and the superior and inferior laryngeal arteries were exposed. The epiglottis was drawn to the right, in order to bring the vessels into view, which it is supplied by the superior laryngeal artery. On both sides the mucous membrane of the root of the tongue and of the tonsils was partially removed, in order to expose the trachea and esophagus. The diagram of the cricoid at the base of the tongue of the hindmost dorsal lingual branch, and the superficial ramification of that artery.

Arteries of the Tongue, the Larynx, the Tonsil (Amygdala), and the Thyroid Body.

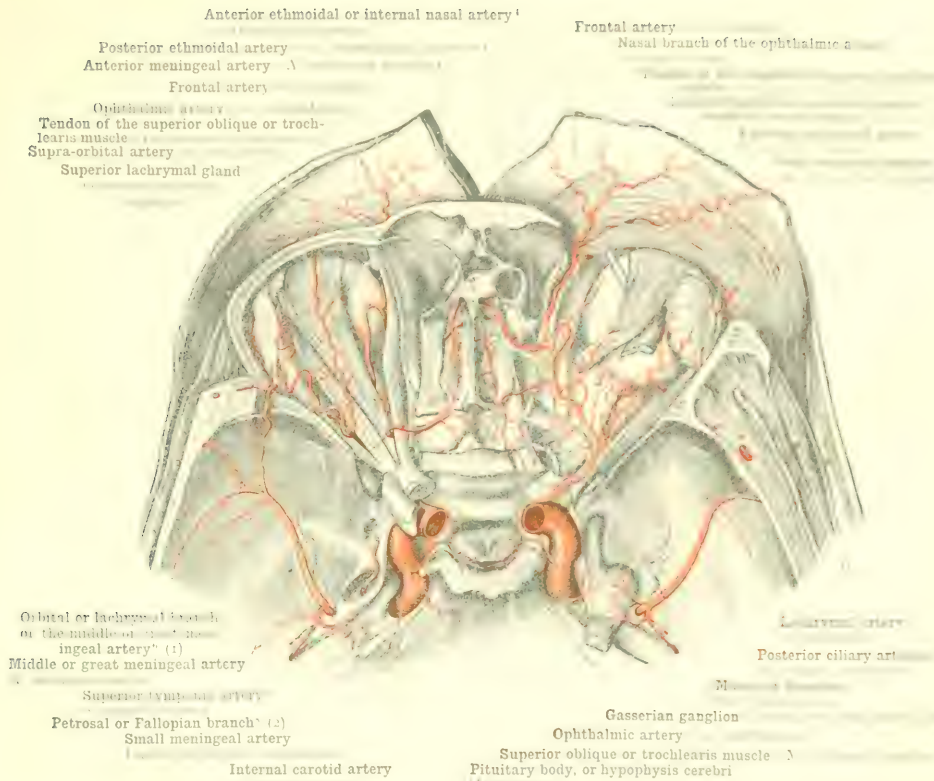


FIG. 101. The arterial system of the orbit and the anterior and middle cranial fossae.



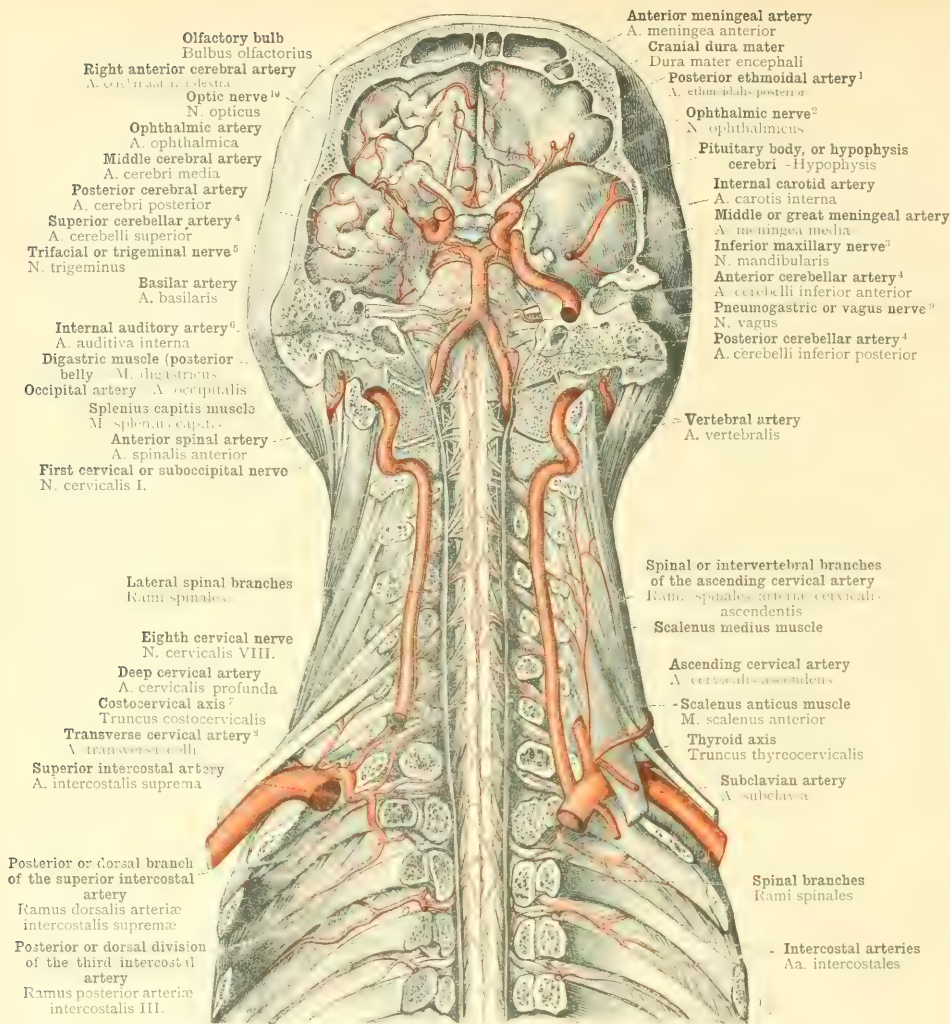


FIG. 141. IN THE THORAX, THE BODIES OF THE VERTEBRÆ WITH THE HEADS OF THE RIBS HAVE BEEN REMOVED; IN THE NECK, THE BODIES OF THE VERTEBRÆ AND THE ANTERIOR LIMBS OF THE TRANSVERSE PROCESSSES (i.e., THE COSTAL PROCESSES), SO AS TO EXPOSE THE VERTEBRAL ARTERY, AND, AFTER CUTTING AWAY THE ANTERIOR PORTION OF THE SPINAL DURA MATER, THE SPINAL BRANCHES OF THE VERTEBRAL ARTERY AND THE SPINAL OR INTERVERTEBRAL BRANCHES OF THE ASCENDING CERVICAL ARTERY. IN THE HEAD, THE GREATER PART OF THE BASE OF THE SKULL HAS BEEN CUT AWAY, AND ON THE RIGHT SIDE THE EXPOSED PORTION OF THE CRANIAL DURA MATER HAS ALSO BEEN REMOVED, SO AS TO LAY BARE THE ARTERIES OF THE BASE OF THE BRAIN. SEEN FROM BEFORE. THE INTERNAL AUDITORY ARTERY, ARTERIA AUDITIVA INTERNA (see note <sup>6</sup> above), ARISES IN THIS SPECIMEN FROM THE ANTERIOR CEREBELLAR ARTERY, ARTERIA CEREBELLI INFERIOR ANTERIOR (see Appendix, note <sup>115</sup>), INSTEAD OF, AS NORMALLY, DIRECTLY FROM THE BASILAR ARTERY. THIS IS A COMMON VARIETY.

A. vertebralis, the vertebral artery. A. basilaris, the basilar artery. A. carotis interna, the internal carotid artery.



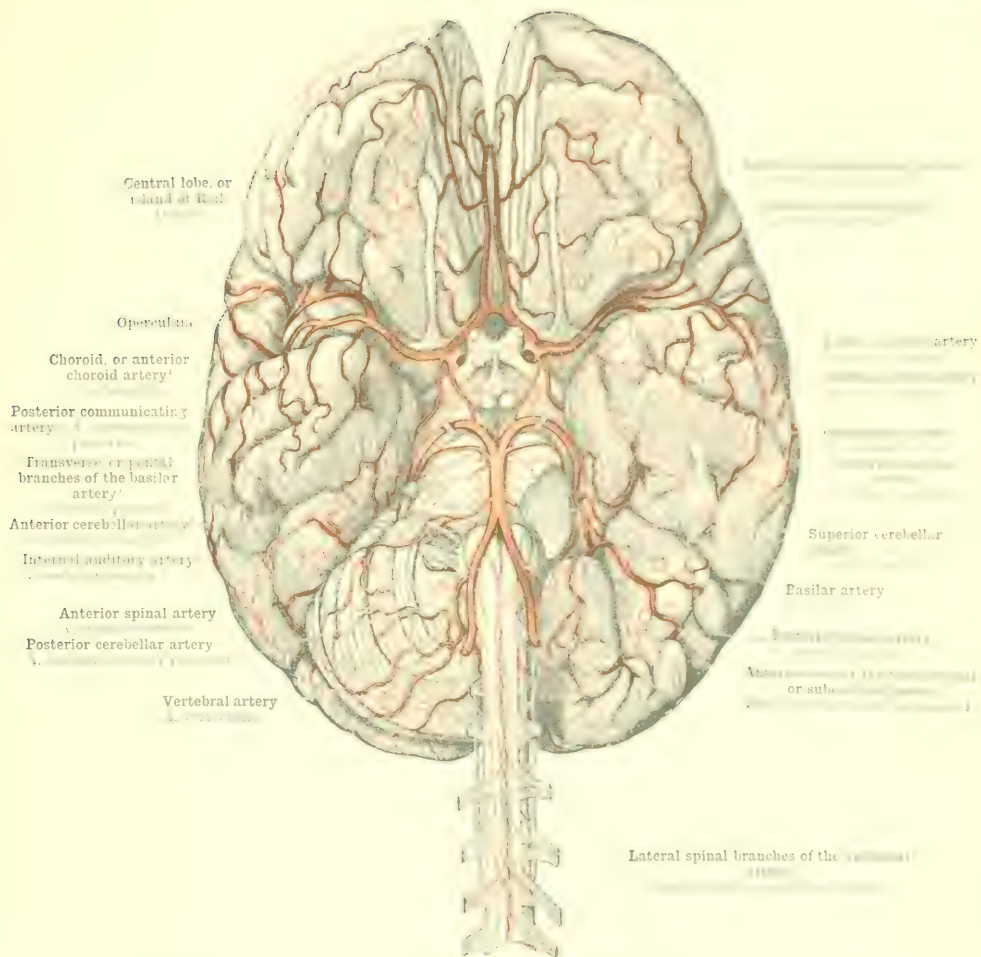
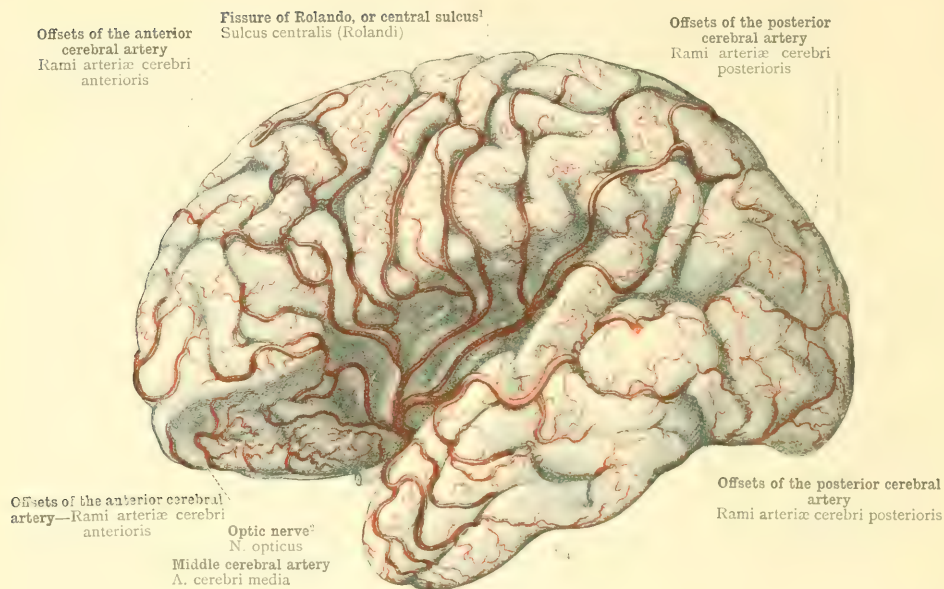


FIG. 1012. The Arteries of the Brain, as they appear in the dissection of the human body.

The arterial supply of the brain is derived from the common carotid arteries, which give off the internal carotid arteries, and the vertebral arteries, which give off the subclavian arteries. The internal carotid arteries give off the ophthalmic and maxillary arteries, and the vertebral arteries give off the suboccipital and posterior auricular arteries. The internal carotid arteries and the vertebral arteries join to form the basilar artery, which gives off the anterior and posterior cerebral arteries, and the cerebellar arteries. The anterior cerebral arteries give off the pericallosal and callosomarginal arteries, and the posterior cerebral arteries give off the callosal and callosomarginal arteries. The cerebellar arteries give off the anterior and posterior cerebellar arteries, and the cerebellar arteries give off the superior and inferior cerebellar arteries.



*Fig. 1013.*—The ramification of the cerebral arteries, arteriæ cerebri, on the convex (outer) surface of the left cerebral hemisphere and the central lobe or island of Reil, and also on the basal (inferior) surface of the frontal lobe. The left hemisphere of the cerebrum, seen from the outer side.

FIG. 1013.—THE RAMIFICATION OF THE CEREBRAL ARTERIES, ARTERIÆ CEREBRI, ON THE CONVEX (OUTER) SURFACE OF THE LEFT CEREBRAL HEMISPHERE AND THE CENTRAL LOBE OR ISLAND OF REIL, AND ALSO ON THE BASAL (INFERIOR) SURFACE OF THE FRONTAL LOBE. THE LEFT HEMISPHERE OF THE CEREBRUM, SEEN FROM THE OUTER SIDE.

The fissure of Sylvius, fissura cerebri lateralis (Sylvii), was widely opened by the separation of the adjoining lobes of the cerebral hemisphere, in order to display the ramification of the middle cerebral artery, arteria cerebri media, at the bottom of the fissure.

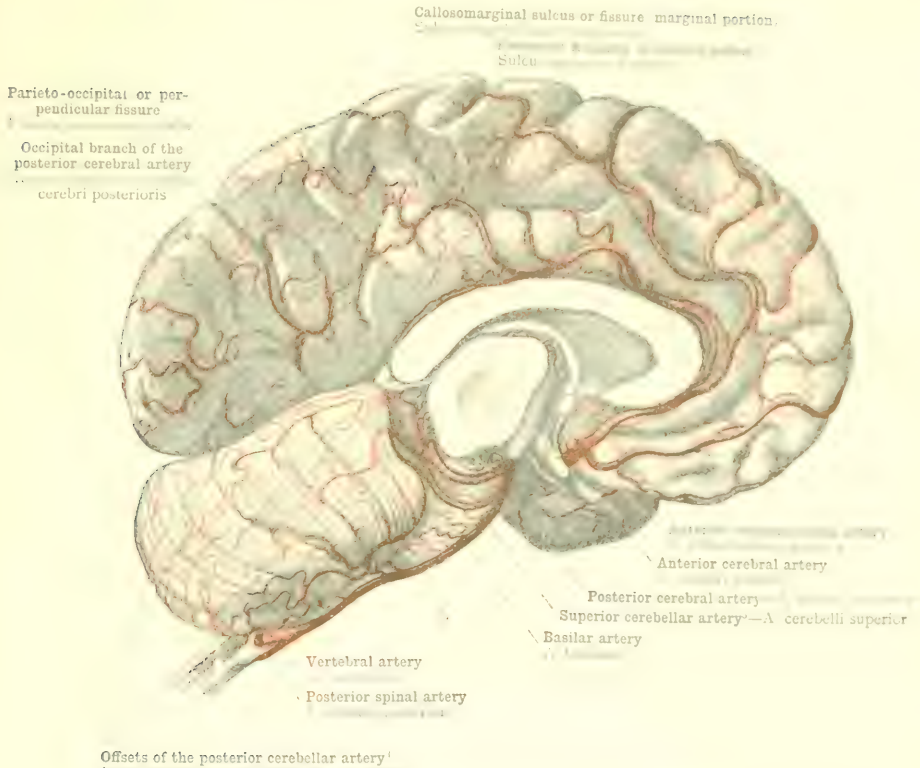


FIG. 104. THE RIGHT HEMISPHERE OF THE HUMAN BRAIN, SHOWING THE COURSE OF THE CAROTID AND VERTEBRAL ARTERIES, AND THE DISTRIBUTION OF THE ARTERIES OF THE CEREBRUM AND CEREBELLUM. The posterior cerebral artery is shown in its course from the basilar artery to the occipital lobe. The anterior cerebral artery is shown in its course from the common carotid artery to the frontal lobe. The middle cerebral artery is shown in its course from the common carotid artery to the lateral surface of the hemisphere. The cerebellar arteries are shown in their course from the vertebral and basilar arteries to the cerebellum and brainstem.

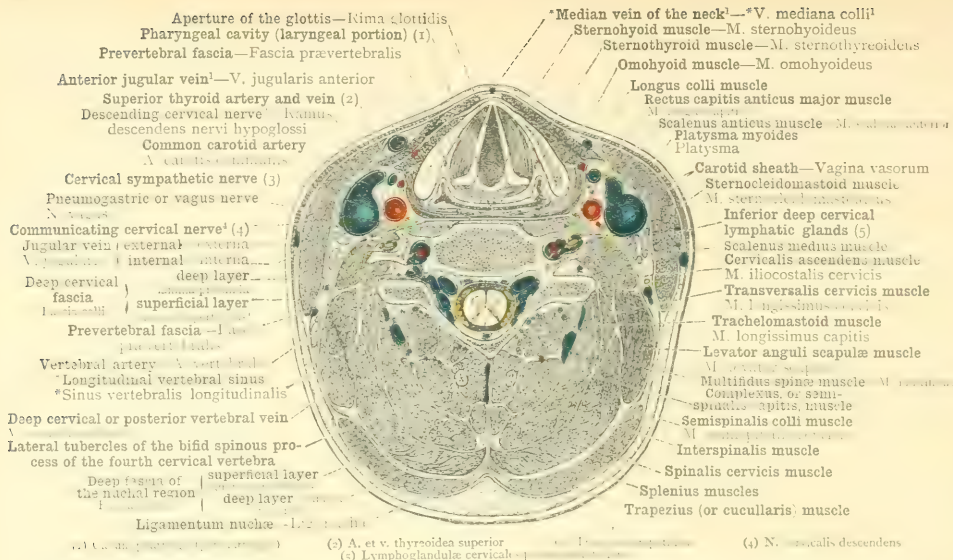


FIG. 1015.—TRANSVERSE SECTION THROUGH THE NECK, AT THE LEVEL OF THE APERTURE OF THE GLOTTIS, AND PASSING THROUGH THE BODY OF THE FIFTH CERVICAL VERTEBRA (UPPER SURFACE OF THE LOWER SEGMENT).

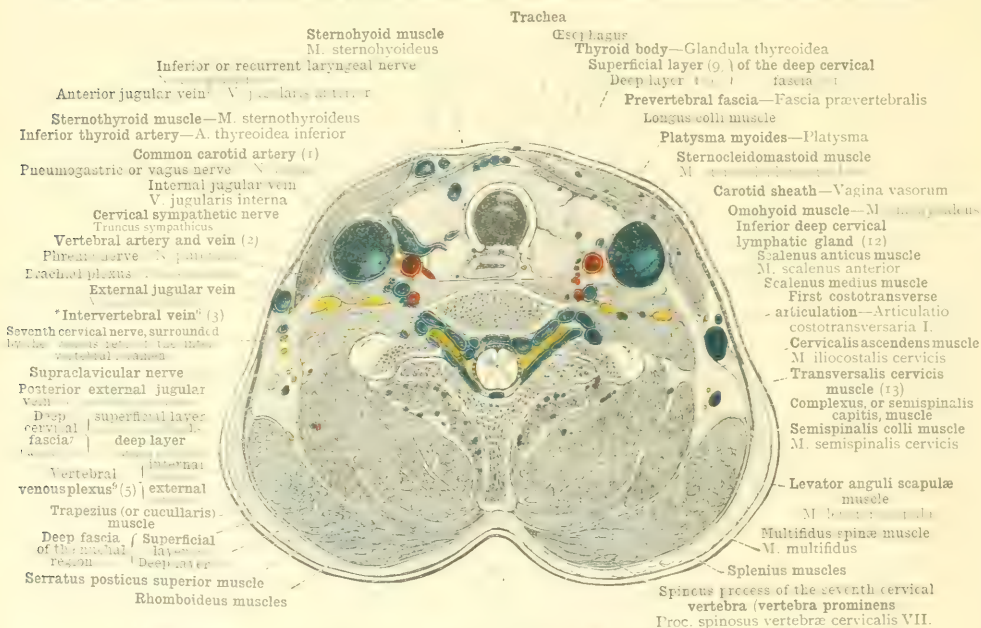


FIG. 1016.—TRANSVERSE SECTION THROUGH THE NECK, PASSING THROUGH THE SPINE NEAR THE LOWER SURFACE OF THE BODY OF THE SEVENTH CERVICAL VERTEBRA (VERTEBRA PROMINENS), UPPER SURFACE OF THE LOWER SEGMENT.



ARTERIÆ EXTREMITATUM  
SUPERIORUM ET INFERIORUM

THE ARTERIES OF THE  
UPPER AND LOWER EXTREMITIES

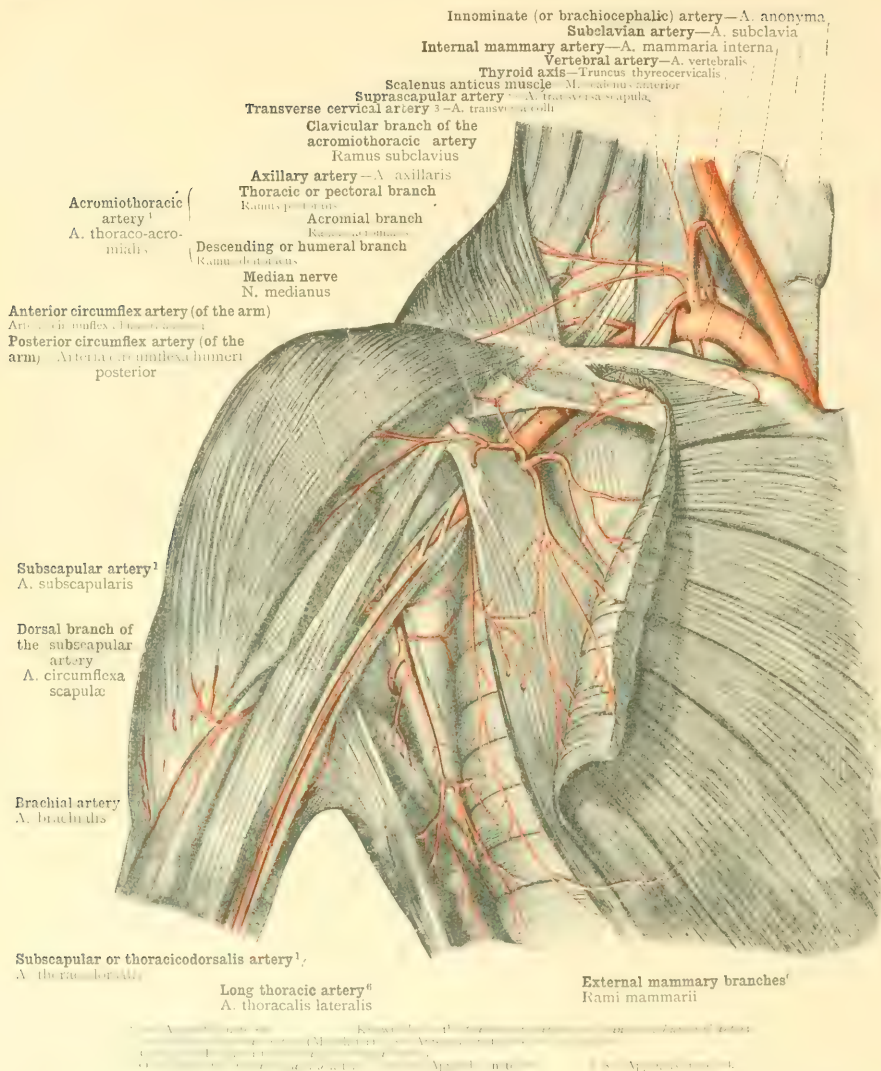
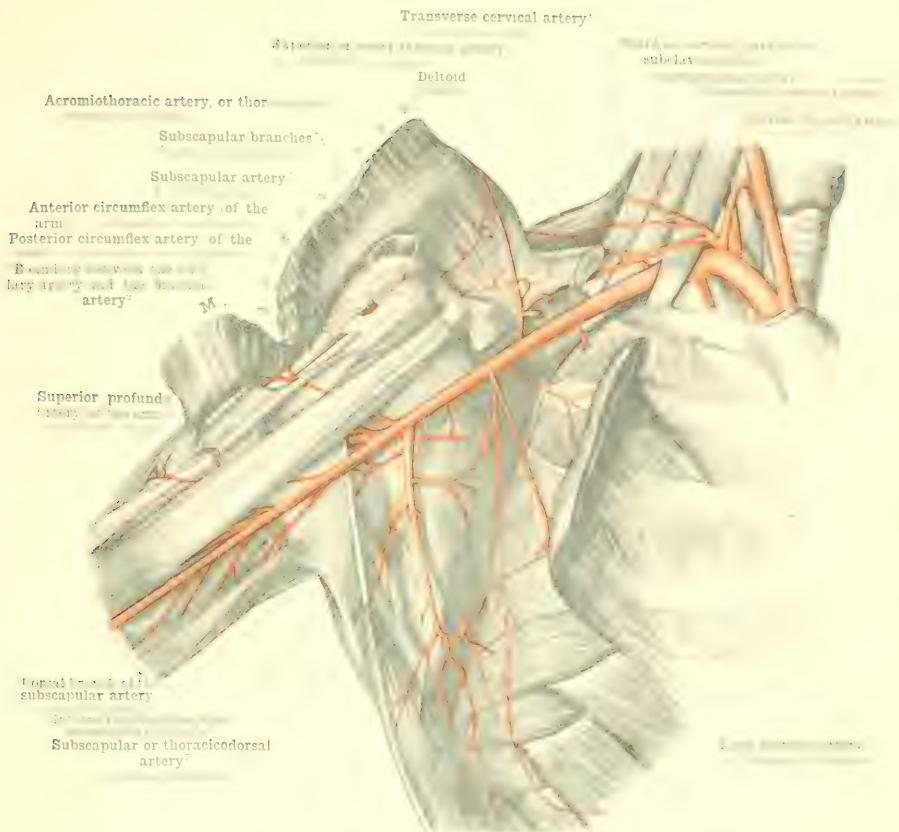


FIG. 1947. RIGHT SUBCLAVIAN AND AXILLARY ARTERIES AND THEIR RELATION TO THE BRACHIAL PLEXUS; SEEN FROM THE FRONT AND THE INNER SIDE. THE DIVISION OF THE INNOMINATE (OR BRACHIOCEPHALIC) ARTERY INTO RIGHT SUBCLAVIAN AND COMMON CAROTID ARTERIES. \*THORACIC PORTION OF THE SUBCLAVIAN ARTERY (A. THORACIS LATERALIS) WITH THE ORIGIN OF THE VERTEBRAL ARTERY, THE THYROID AXIS, AND THE INTERNAL MAMMARY ARTERY; THE CERVICAL (THIRD) PORTION OF THE SUBCLAVIAN ARTERY (see Appendix, note 205), WITH THE ORIGIN OF THE TRANSVERSE CERVICAL ARTERY.

Of the branches of the axillary artery (see Appendix, note 206) we see: the branches of the acromiothoracic artery, arteria thoraco-acromialis, the thoracic or pectoral branch, ramus pectoralis, the clavicular branch, ramus subclavius, the acromial branch, ramus acromialis, and the descending or humeral branch, ramus deltoideus; the long thoracic artery, arteria thoracalis lateralis; the (long) subscapular artery, arteria subscapularis, and its division into the dorsal scapular artery, arteria circumflexa scapulae, and the thoracicodorsalis artery, arteria thoracicodorsalis (see Appendix, note 203); the anterior and posterior circumflex arteries (of the arm), arterie circumflexe humeri, anterior et posterior.

A. subclavia, the subclavian artery; A. axillaris, the axillary artery.



$\Delta$ , indicating the relative quantity;  $\Delta^2$  indicates the relative error;

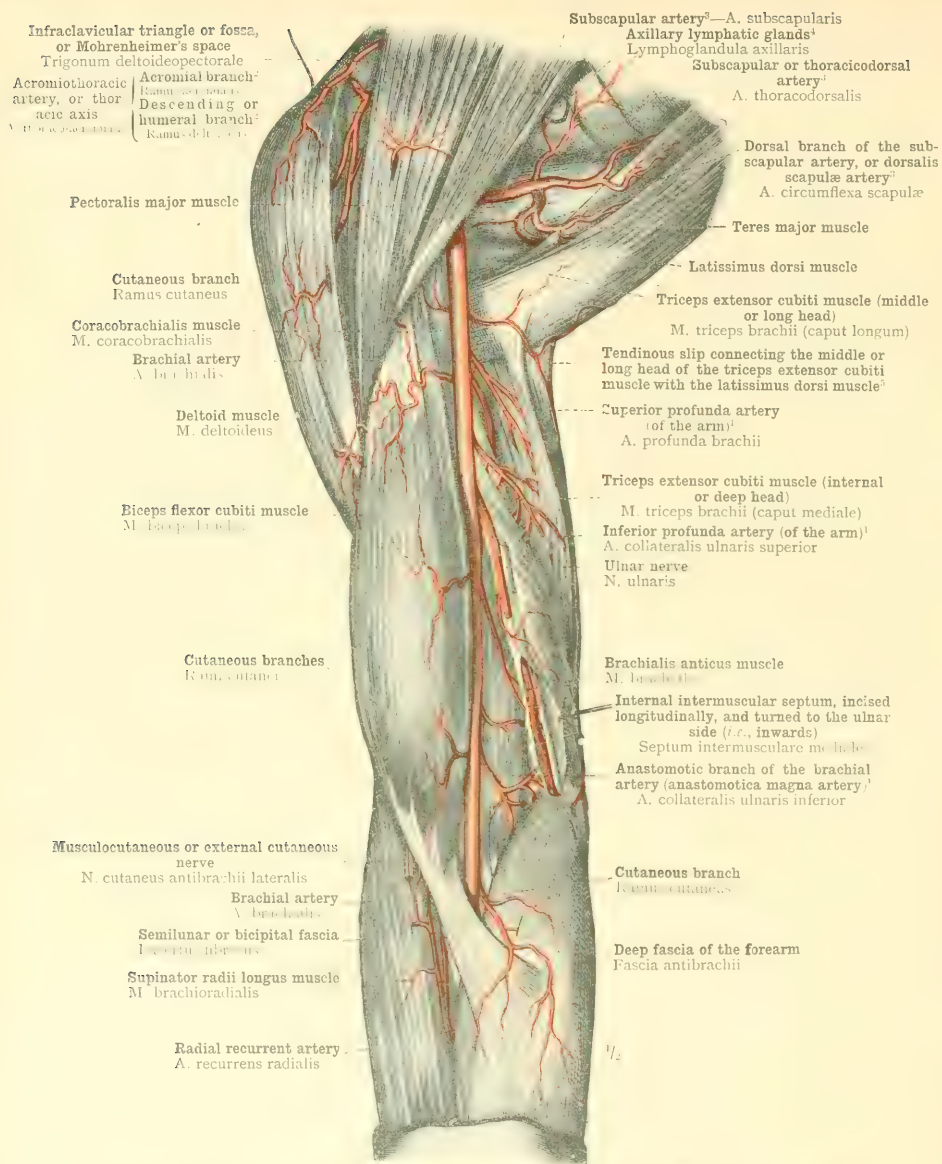


FIG. 1019.—THE ARTERIES OF THE RIGHT UPPER ARM, SHOULDER, AND AXILLARY REGION; SEEN FROM THE FRONT AND THE INNER SIDE.

Regarding the branches of the brachial artery, see Appendix, note 209; and regarding the upper limit of the brachial artery, see Appendix, note 210.





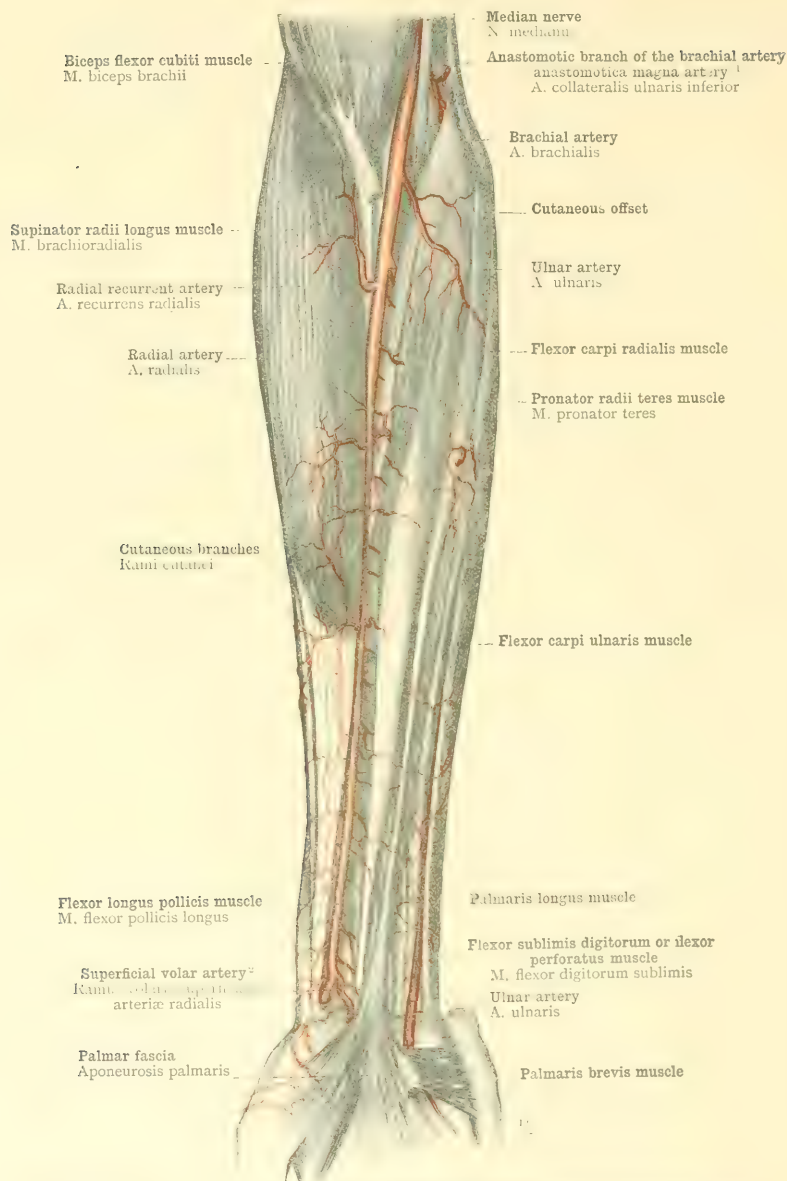
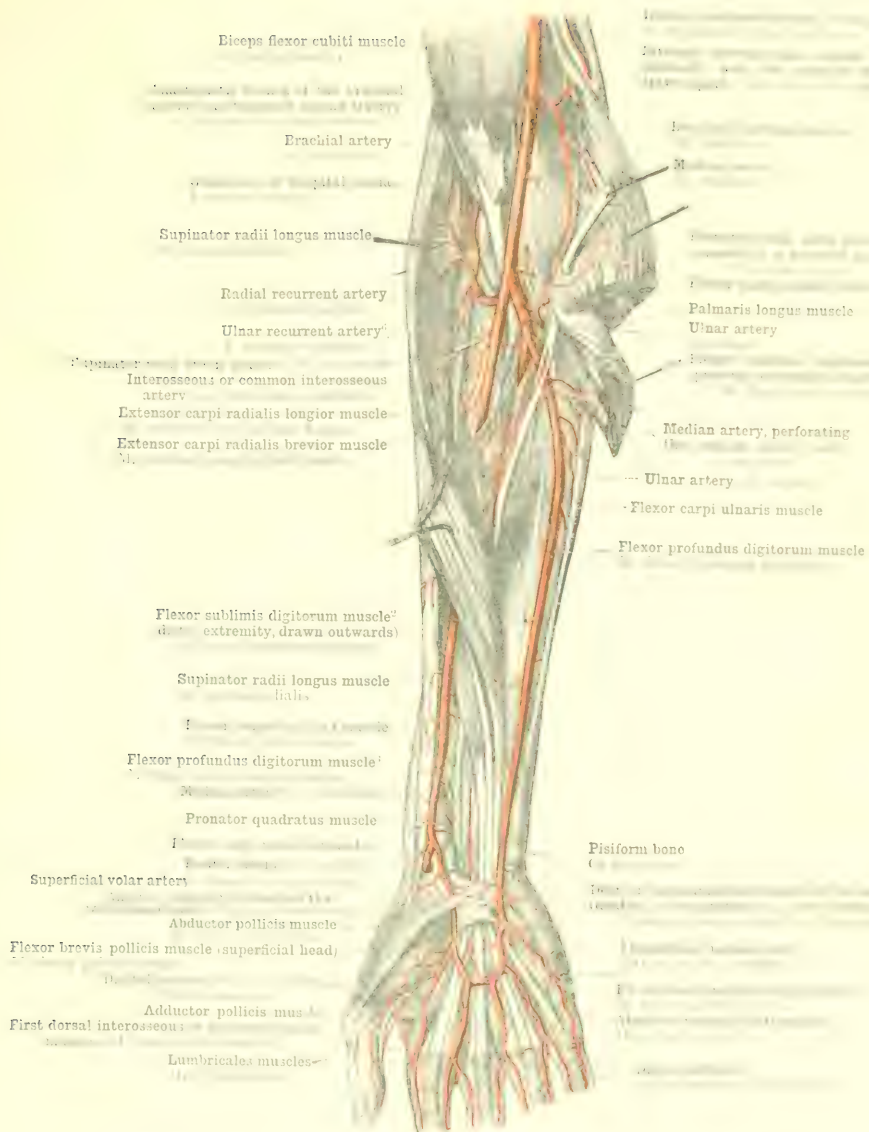


FIG. 1021.—THE SUPERFICIAL ARTERIES OF THE ANTECUBITAL FOSSA AND THE PALMAR SURFACE OF THE RIGHT FOREARM.

Palmar Arteries of the Forearm and the Hand.



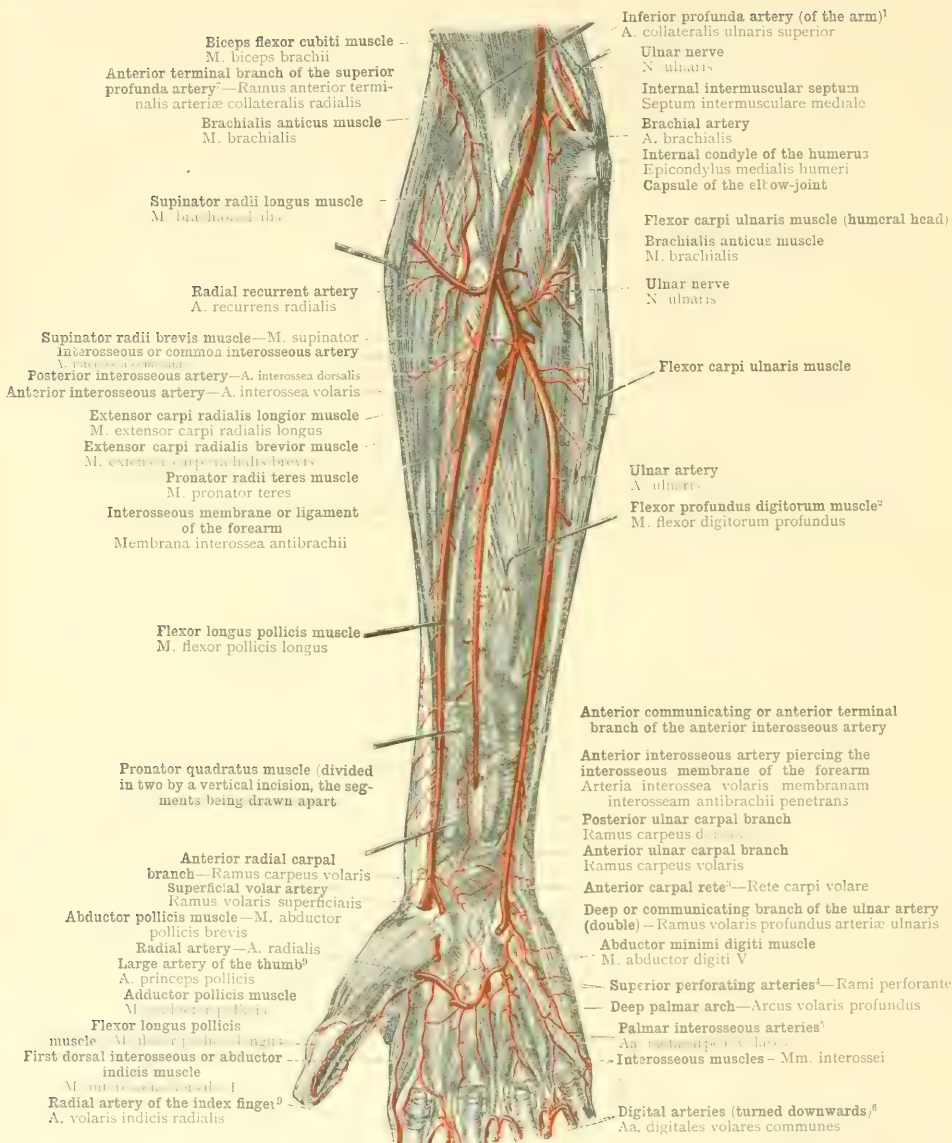


FIG. 1023.—THE ANTERIOR INTEROSSEOUS ARTERY OF THE RIGHT FOREARM AND THE DEEP PALMAR ARCH; SEEN FROM BEFORE.

Palmar Arteries of the Forearm and Hand.



Posterior terminal branch of the superior profunda artery

Triceps extensor cubiti muscle  
M. triceps

Biceps flexor cubiti muscle

Supinator radii longus muscle

Extensor carpi radialis longior muscle

Rete olecrani

Anterior muscle divided by a vertical incision, the segments being drawn apart

Supinator radii brevis muscle

Posterior interosseous recurrent artery

Posterior interosseous nerve

Extensor carpi ulnaris muscle

Posterior interosseous artery

Extensor carpi ulnaris muscle

Extensor ossis metacarpi pollicis or abductor longus pollicis muscle

Extensor carpi radialis brevis muscle

Dorsal or perforating offsets of the anterior interosseous artery

Extensor primi internodii pollicis or extensor brevis pollicis muscle

Anterior interosseous artery posterior terminal branch

Extensor secundi internodii pollicis or extensor longus pollicis muscle

Extensor indicis muscle  
M. proprius

Posterior terminal branch of the wrist

Posterior carpal rete

Posterior ulnar carpal branch

Posterior radial carpal branch

Perforating branch

Radial artery

Dorsal interosseous arteries

Extensor digitorum or

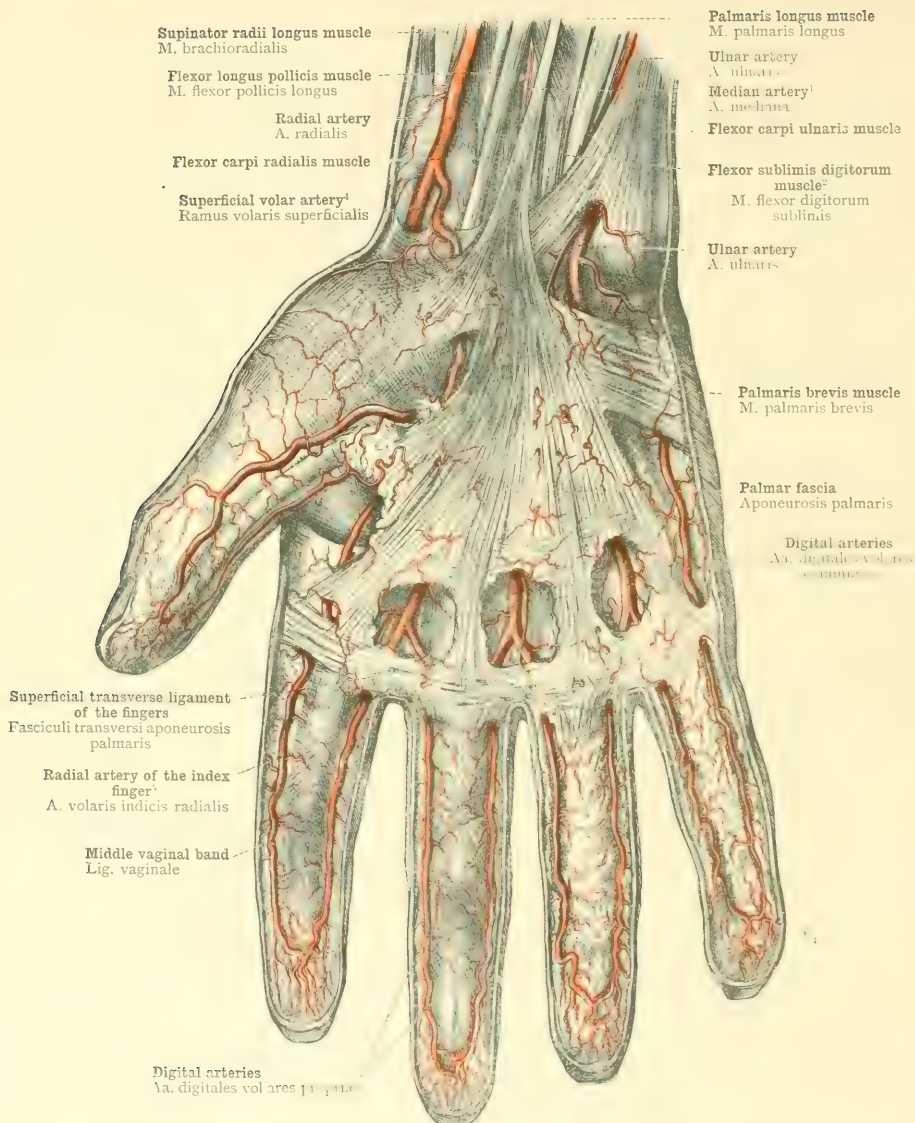
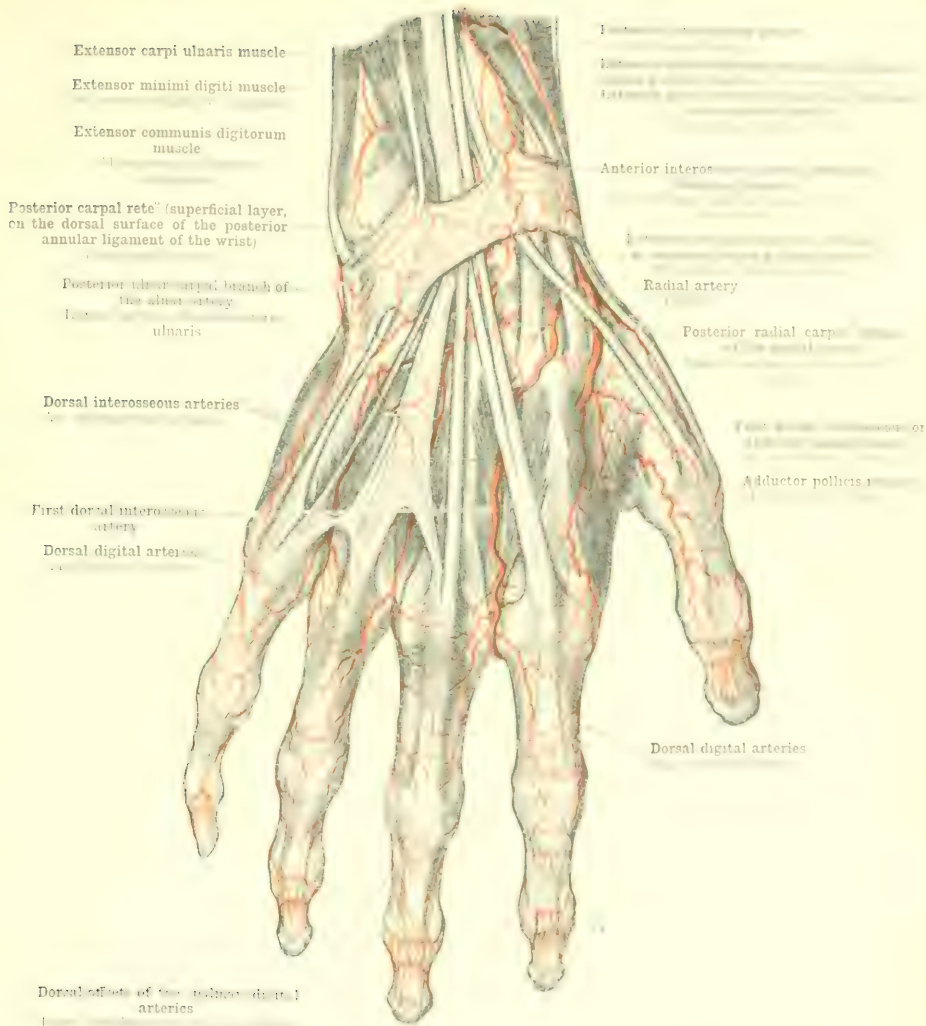


FIG. 1025.—THE SUPERFICIAL ARTERIES OF THE PALM OF THE HAND; THE PALMAR DIGITAL ARTERIES.

In the thumb, the index, and the middle finger, the skin and the superficial fascia have been removed, thus exposing the digital sheaths of the flexor tendons (ligamenta vaginalia, etc.). In the ring and little fingers, the superficial fascia and the arteries ramifying in it have been preserved.



| Artery                | Course  | Branches   | Notes |
|-----------------------|---|--|-------|
| Radial artery         | From the brachial artery, it runs along the lateral side of the forearm, deep to the brachioradialis muscle, and divides into the deep and superficial palmar arches. | Deep palmar arch, superficial palmar arch        |       |
| Ulnar artery          | From the brachial artery, it runs along the medial side of the forearm, deep to the pronator teres muscle, and divides into the deep and superficial palmar arches.   | Deep palmar arch, superficial palmar arch        |       |
| Interosseous arteries | Formed by the union of the radial and ulnar arteries, they run along the interosseous space and divide into the dorsal and palmar digital arteries.                   | Dorsal digital arteries, palmar digital arteries |       |

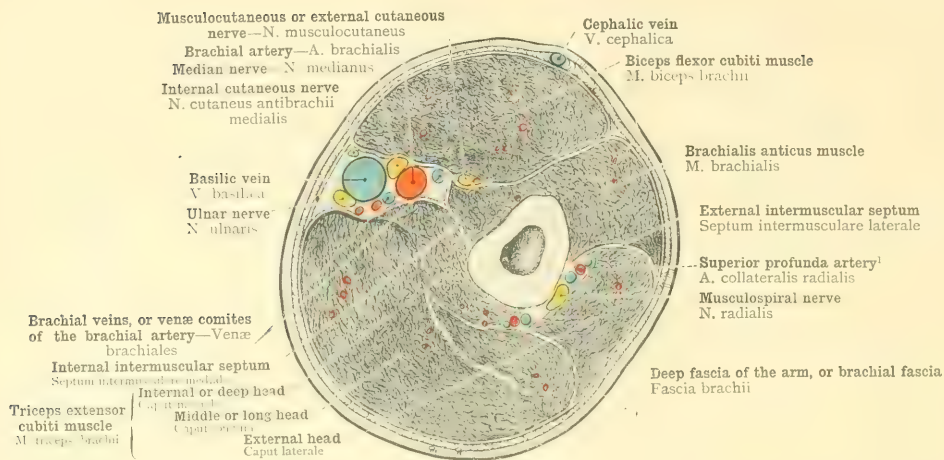


FIG. 1027.—TRANSVERSE SECTION THROUGH THE MIDDLE OF THE RIGHT UPPER ARM; UPPER SURFACE OF LOWER SEGMENT.

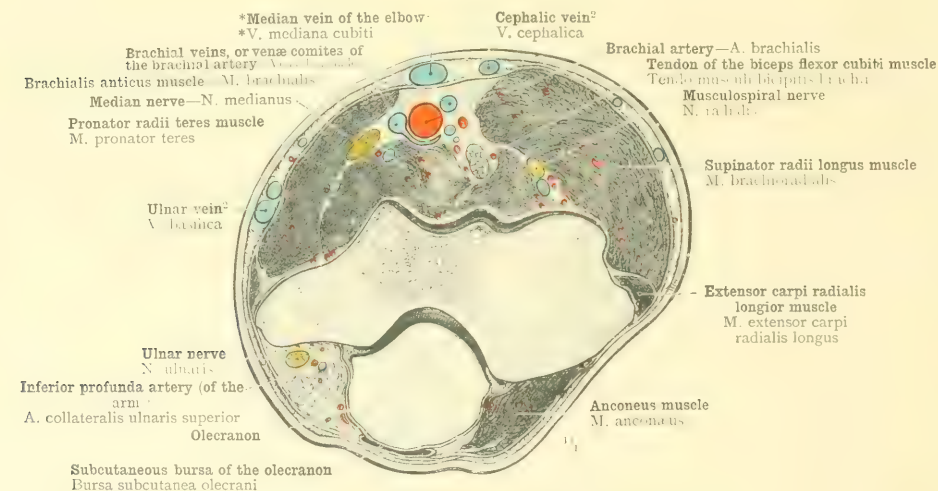
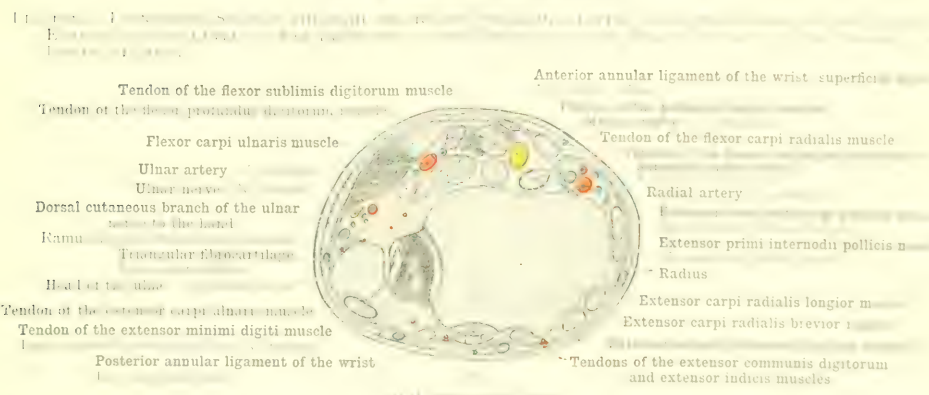
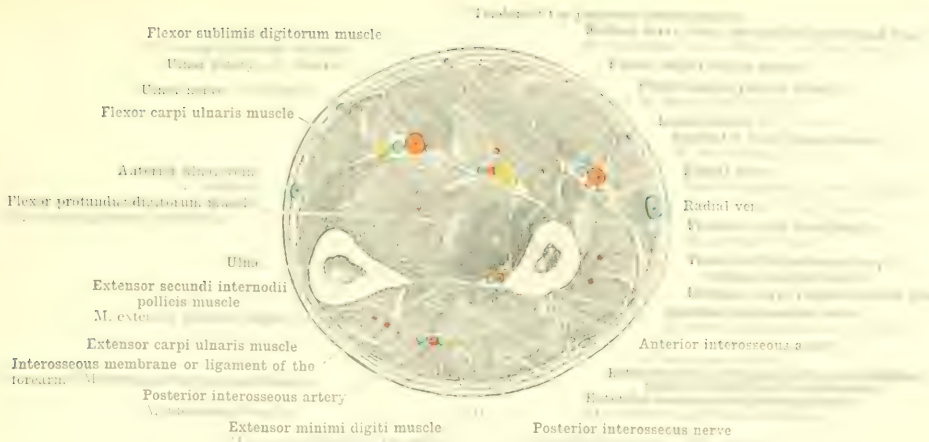
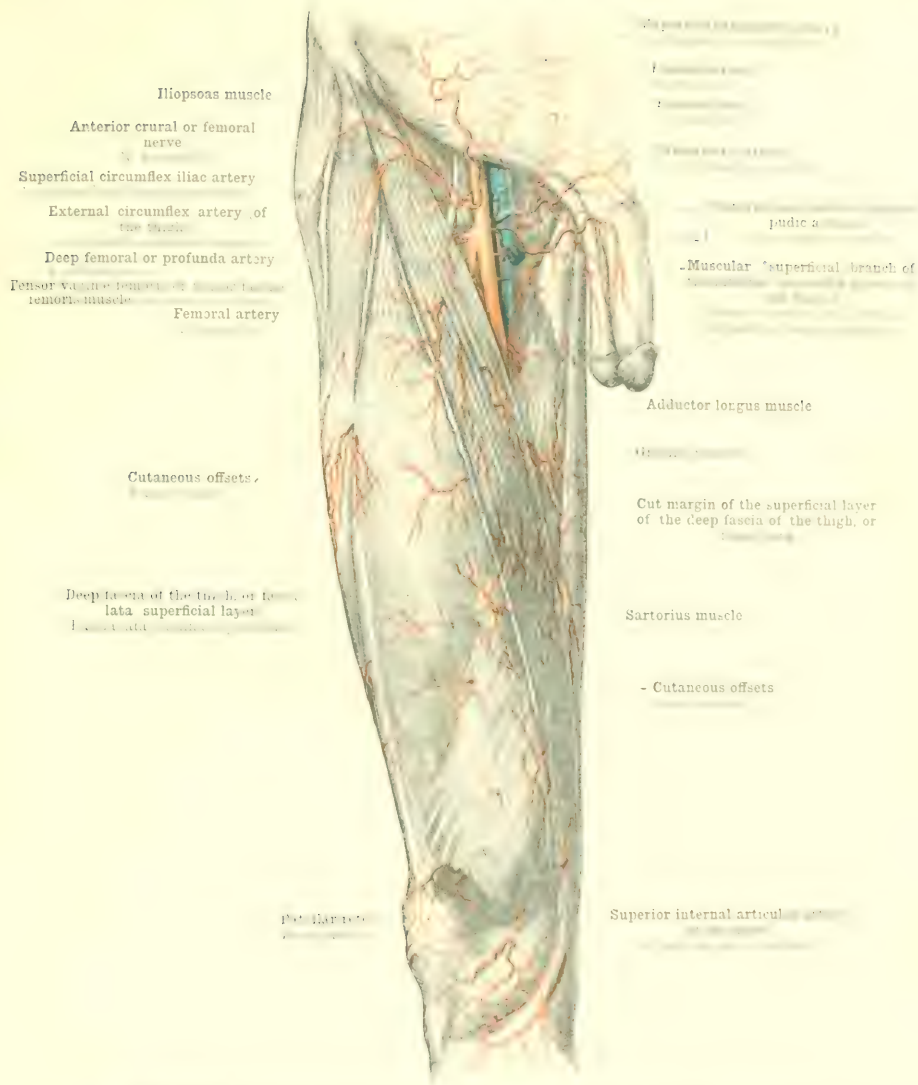


FIG. 1028.—TRANSVERSE SECTION THROUGH THE EXTENDED ELBOW-JOINT AT THE LEVEL OF THE TWO CONDYLES; UPPER SURFACE OF LOWER SEGMENT.









Superficial epigastric artery  
A. epigastrica superficialis

Tensor vaginae femoris or tensor fasciae  
femoris muscle M. tensor fasciae latae

Anterior crural or femoral nerve  
N. femoralis

Femoral artery<sup>1</sup>—A. femoralis

Femoral vein—V. femoralis  
Sartorius muscle

Deep femoral or profunda artery  
A. profunda femoris

External circumflex artery (of the thigh)  
A. circumflexa femoris externa

Ascending branch  
Ramus ascendens

Descending branch  
Ramus descendens

Cut margin of the superficial layer of the  
deep fascia of the thigh, or fascia lata

First or superior perforating artery  
A. perforans prima

Deep femoral or profunda artery  
A. profunda femoris

Vastus internus muscle—  
M. vastus medialis

Femoral vein—V. femoralis  
Internal or long saphenous nerve  
N. saphenus

Femoral artery<sup>1</sup>—  
A. femoralis

Rectus femoris muscle—

\*Articular rete of the knee<sup>2</sup>  
Rete articulare genu

Cremasteric artery<sup>1</sup>  
A. spermatica externa

Internal circumflex artery (of the  
thigh)  
A. circumflexa femoris medialis

Muscular (\*superficial) branch<sup>2</sup>  
Ramus superficialis

Adductor brevis muscle

Adductor longus muscle

Gracilis muscle

Anterior wall of Hunter's canal  
Paries anterior canalis  
adductorii (Hunteri)

Muscular branch<sup>2</sup>  
Ramus muscularis

Internal or long saphenous nerve  
N. saphenus  
Sartorius muscle

Anastomotic artery<sup>1</sup>  
A. genu superior

Superior internal articular artery  
A. articularis superior

Articular branch of the anastomotic artery<sup>3</sup>  
Ramus articularis

Superficial branch of the  
anastomotic artery<sup>1</sup>  
Ramus saphenus

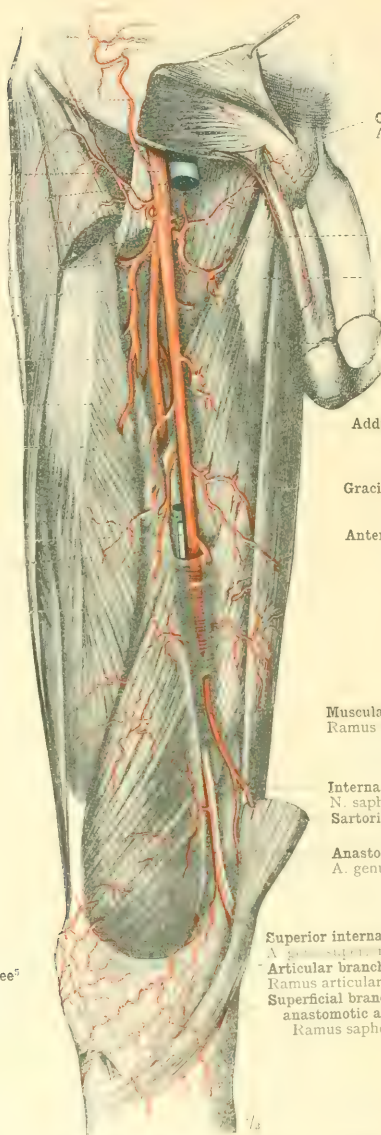


FIG. 14. THE DEEPER ARTERIES OF THE FRONT OF THE THIGH. THE MIDDLE PORTION OF THE SARTORIUS MUSCLE HAS BEEN CUT AWAY. THE FEMORAL VEIN IS SHOWN IN THE LOWER PORTION OF THE THIGH. THE DEEPER ARTERIES OF THE FRONT OF THE THIGH. THE MIDDLE PORTION OF THE SARTORIUS MUSCLE HAS BEEN CUT AWAY. THE FEMORAL VEIN IS SHOWN IN THE LOWER PORTION OF THE THIGH.

The middle portion of the sartorius muscle has been cut away.



Proximal extremity of the sartorius muscle

Anterior crural or femoral nerve  
Gluteus medius muscle

Rectus femoris muscle

Distribution of the deep femoral artery

Tensor vagina femoris or tensor

External circumflex artery

Ascending branch

Descending branch

Vastus medialis muscle

First or superior perforating artery

Second or middle perforating artery

Rectus femoris muscle  
Deep femoral or profunda artery

Muscular branches

Vastus internus muscle drawn outwards

Articular branches taking part in the formation of the articular rete of the knee

Deep branch

Muscular

Adductor longus

Gracilis

First or superior perforating artery

Adductor magnus muscle  
Femoral artery

Femora

Popliteal space, forming the inferior orifice of Hunter's canal

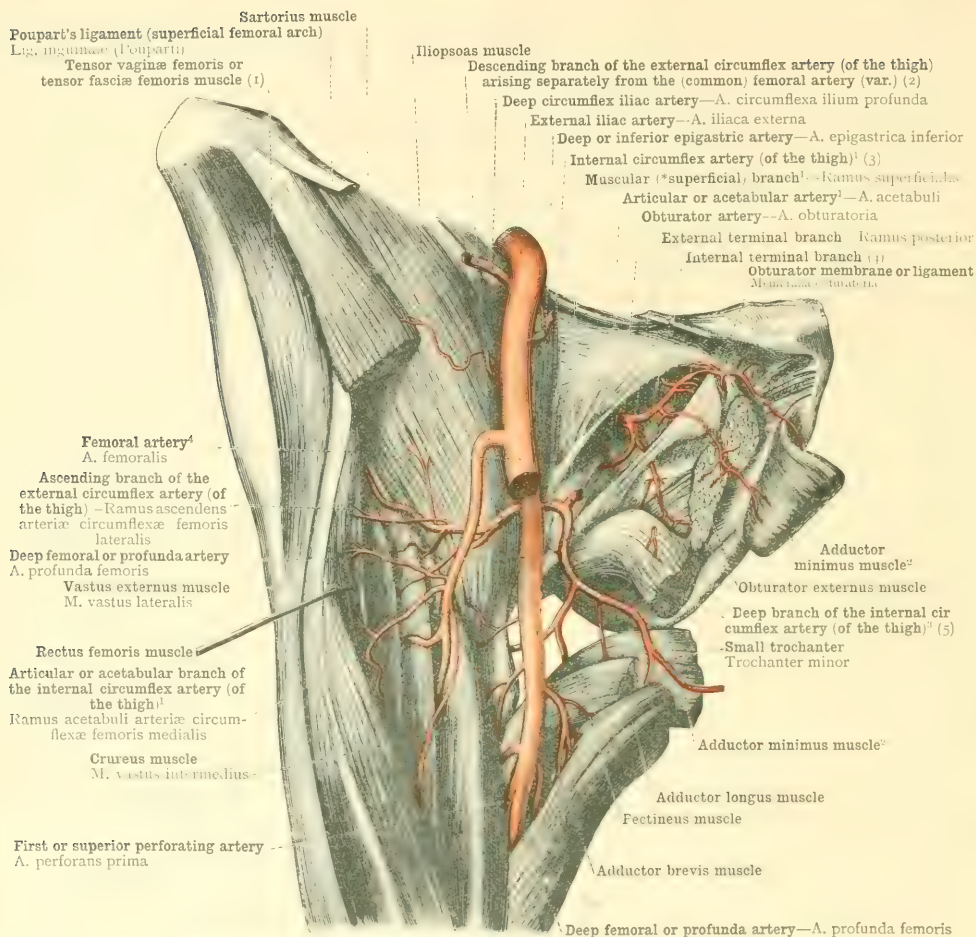
Popliteal vein

Popliteal artery

Distal

Superficial branch

Articular



(1) M. Sartorius from later.

(2) A. circumflexa ilium profunda.

(3) Branch of the internal circumflex artery (of the thigh) arising from the profunda femoris artery.

(4) Branch of the profunda femoris artery.

<sup>1</sup> See Appendix, note 224.

<sup>2</sup> The adductor minimus muscle, which has been entirely removed, the adductor longus and adductor brevis muscles, which have been divided transversely, the parts below the incision have been drawn apart, the adductor minimus muscle has been divided transversely, and the segments have been drawn apart. The obturator externus muscle, which has been thus exposed, has been divided by an incision passing vertically downwards from its upper border, and the inner segment of the muscle has been turned downwards and inwards.

FIG. 1036.—THE RIGHT OBTURATOR ARTERY, ITS DIVISION INTO INTERNAL AND EXTERNAL TERMINAL BRANCHES, AND THE ORIGIN FROM THE LATTER OF THE ARTICULAR OR ACETABULAR ARTERY. THE DEEP FEMORAL OR PROFUNDA ARTERY, THE \*DEEP BRANCH OF THE INTERNAL CIRCUMFLEX ARTERY (see Appendix, note 224), AND ITS ARTICULAR OR ACETABULAR BRANCH, RAMUS ACETABULI. OF THE TWO PRINCIPAL BRANCHES OF THE EXTERNAL CIRCUMFLEX ARTERY, THE ASCENDING BRANCH ARISES IN THIS SPECIMEN FROM THE DEEP FEMORAL OR PROFUNDA ARTERY, BUT THE DESCENDING BRANCH ARISES FROM THE (COMMON) FEMORAL ARTERY (VAR.).

The sartorius muscle has been removed, except for the proximal extremity; the pectineus, adductor longus, and adductor brevis muscles have been divided transversely, the parts below the incision have been drawn inwards, and the proximal extremities have been cut away. The adductor magnus muscle has been entirely removed, the adductor minimus muscle (see note 2 above) has been divided transversely, and the segments have been drawn apart. The obturator externus muscle, which has been thus exposed, has been divided by an incision passing vertically downwards from its upper border, and the inner segment of the muscle has been turned downwards and inwards.

Cutaneous offsets of the dorsal branches  
of the lumbar arteries

Cutaneous offsets of the gluteal artery

Cutaneous offsets of the sciatic  
artery

Cutaneous offsets of the inferior  
hemipelvic artery, a branch  
of the internal pudic artery

Cutaneous offsets of the muscular branches  
supplied to the adductor muscles by the  
deep femoral or profunda artery

Cutaneous offsets of the perforating  
arteries (internal series)  
of the femur

Cutaneous offsets of the popliteal artery

Cutaneous offsets of the first or  
superior perforating artery

Cutaneous offsets of the other  
perforating arteries

Cutaneous offsets of the posterior  
tibial artery



FIG. 1. The Cutaneous Arteries of the Back of the Thigh and the Buttock. (From the collection of the Anatomical Museum of the University of Bonn.)

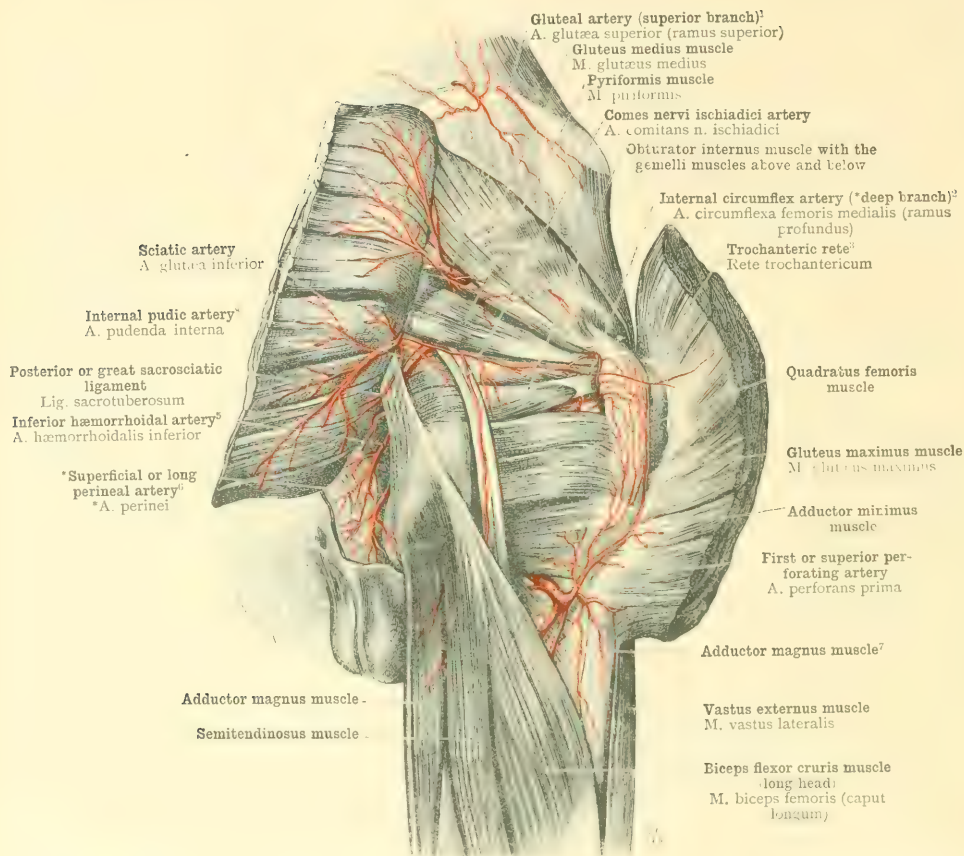
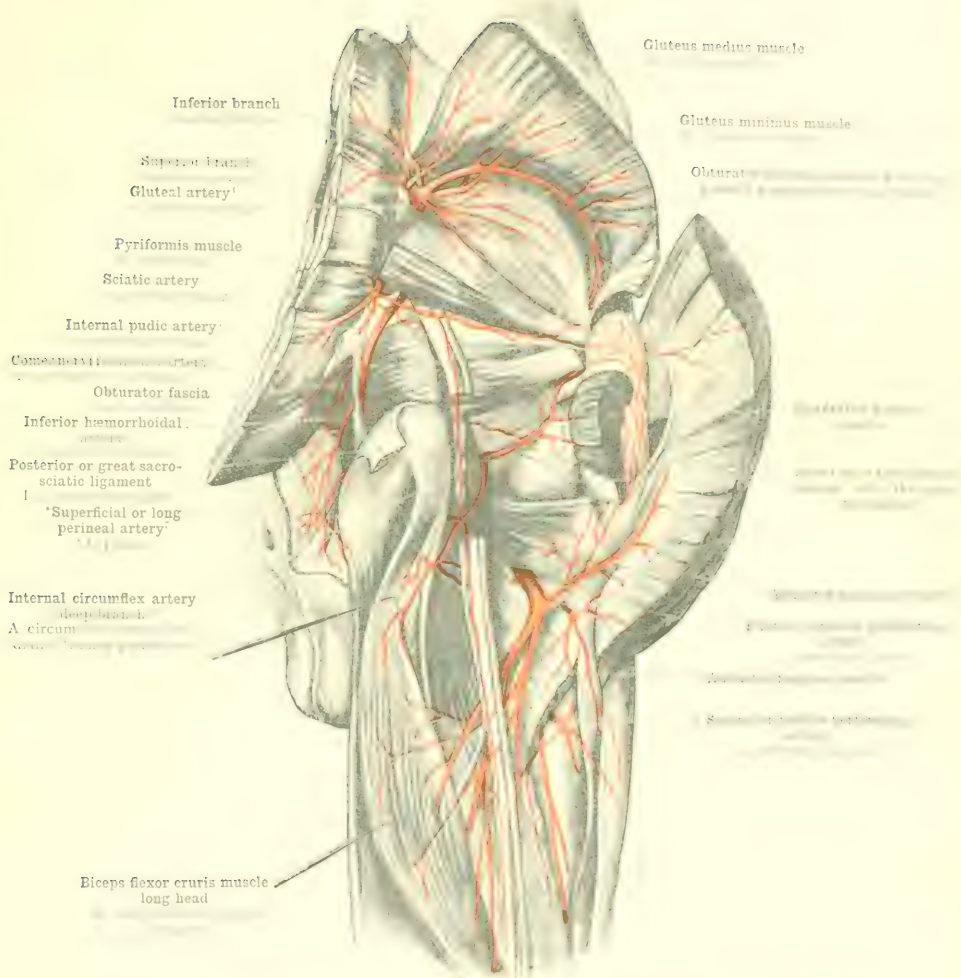


FIG. 1038.—THE DEEP ARTERIES OF THE RIGHT BUTTOCK; SEEN FROM BEHIND. THE UPPER BRANCH, RAMUS SUPERIOR, OF THE DEEP PART OF THE GLUTEAL ARTERY, ARTERIA GLUTEA SUPERIOR; THE SCIATIC ARTERY, ARTERIA GLUTEA INFERIOR, AND THE COMES NERVI ISCHIADICI ARTERY, ARTERIA COMITANS NERVI ISCHIADICI; THE INTERNAL PUDIC ARTERY, ARTERIA PUDENDA INTERNA, FROM ITS EMERGENCE FROM THE PELVIS THROUGH THE GREAT SACROSCIATIC FORAMEN TO ITS ENTRY INTO THE ISCHIORECTAL FOSSA THROUGH THE SMALL SACROSCIATIC FORAMEN; THE INFERIOR OR EXTERNAL HÆMORRHOIDAL ARTERY (ANAL ARTERY), ARTERIA HÆMORRHOIDALIS INFERIOR, AND THE SUPERFICIAL OR LONG PERINEAL ARTERY, ARTERIA PERINEALIS. THE EMERGENCE OF THE FIRST OR SUPERIOR PERFORATING ARTERY, ARTERIA PERFORANS PRIMA, BETWEEN THE ADDUCTOR MINIMUS AND ADDUCTOR MAGNUS MUSCLES (see note <sup>2</sup> to p. 644), AND ITS DIVISION INTO ASCENDING AND DESCENDING BRANCHES; THE CRUCIAL ANASTOMOSIS AND THE TROCHANTERIC RETE, RETE TROCHANTERICUM.

The gluteus maximus muscle has been cut across a little above and internal to its middle, and the segments have been turned inwards and outwards, respectively.

#### Arteries of the Buttock.





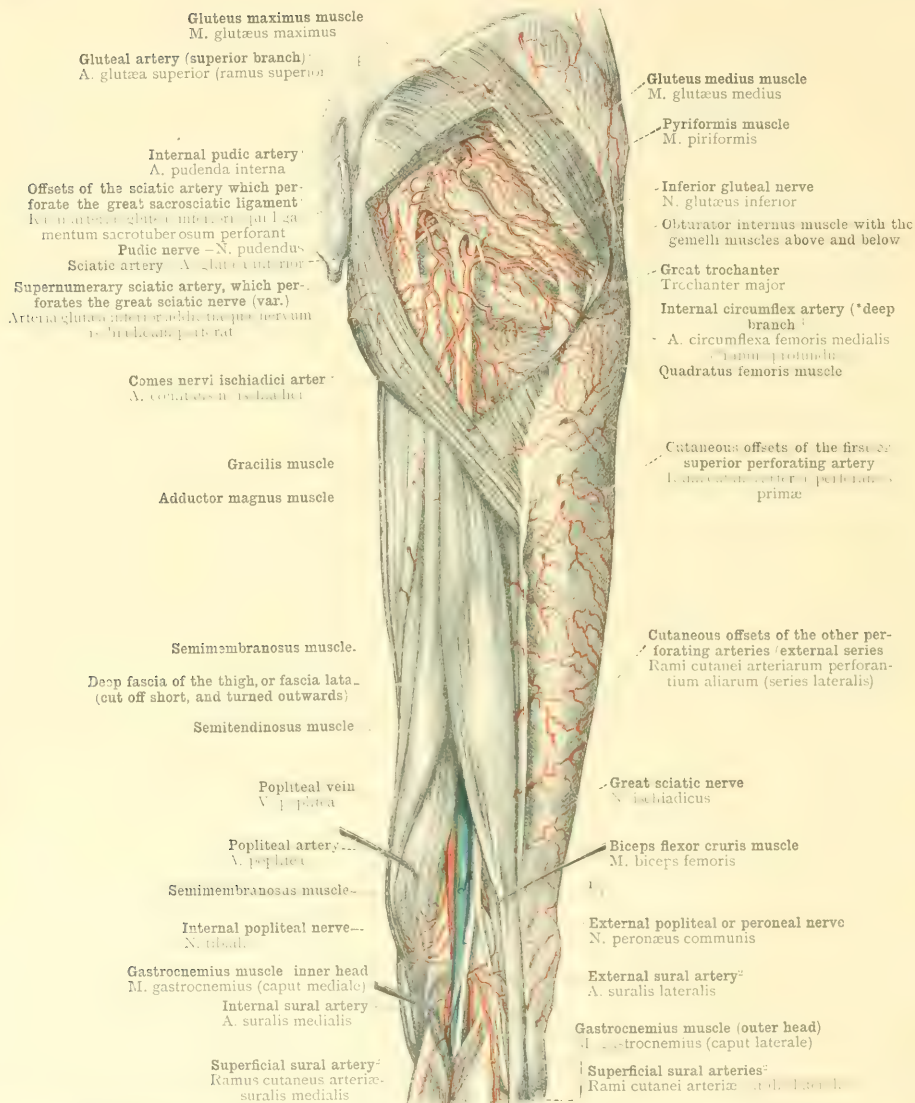


FIG. 124. THE POSTERIOR ANALYSIS OF THE LOWER LIMB: THE CUTANEOUS ARTERIES OF THE POSTERO-EXTERNAL PART OF THE RIGHT THIGH; SEEN FROM BEHIND.

Arteries of the Buttock, the Back of the Thigh, and the Ham.



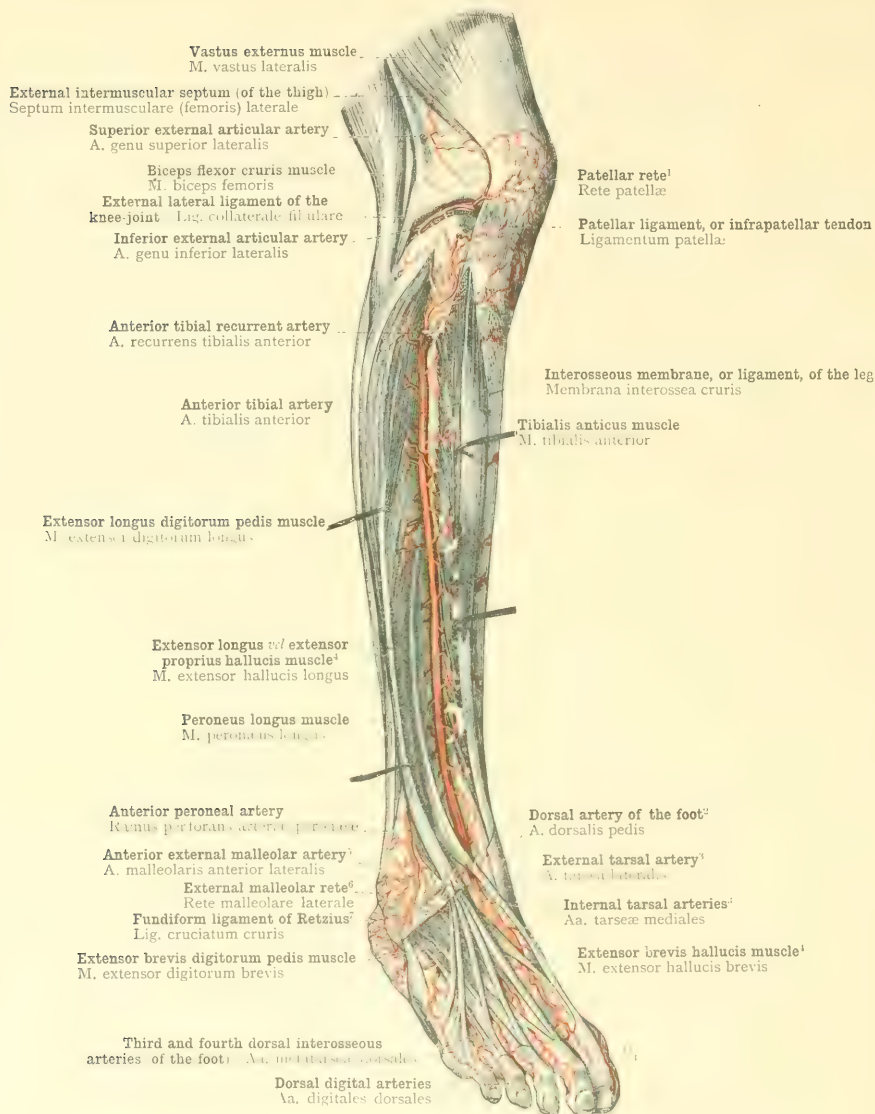


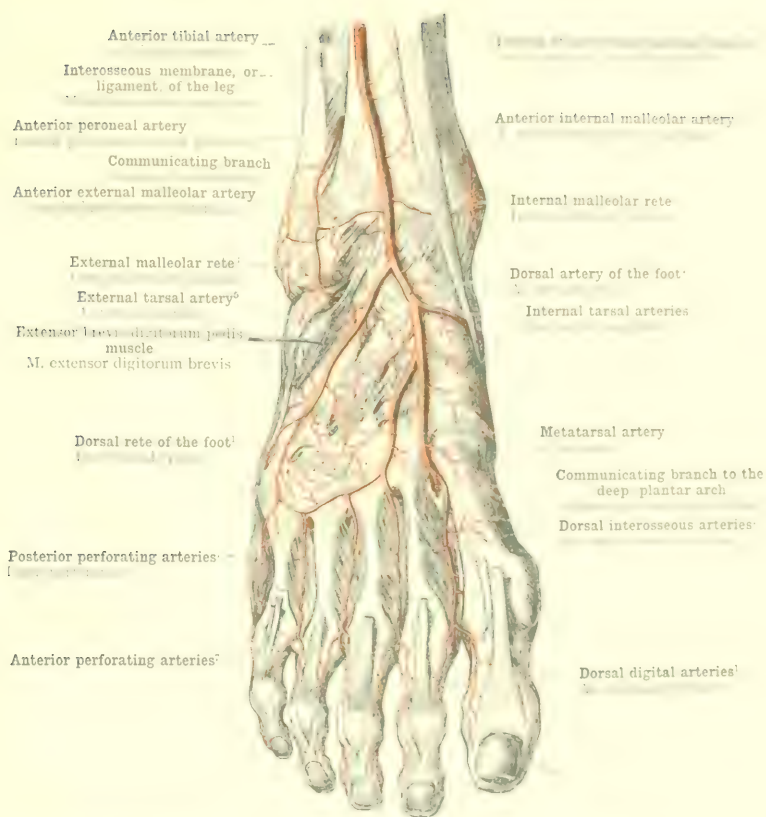
FIG. 1042.—THE ANTERIOR TIBIAL ARTERY AND ITS CONTINUATION INTO THE DORSAL ARTERY OF THE FOOT, OR DORSALIS PEDIS ARTERY.

The continuation of the extensor longus digitorum pedis muscle has been drawn short and the uppermost part of the tendon has been cut away. The articular ligament of the ankle has been invaded by a coronary artery in common and together with the long ligament of Retzius has been raised from the calcaneal tendon of the extensor longus digitorum pedis and peroneus tertius muscles.

<sup>1</sup> See Appendix, p. 1041. <sup>2</sup> See Appendix, p. 1041. <sup>3</sup> See Appendix, p. 1041. <sup>4</sup> See Appendix, p. 1041.

<sup>5</sup> See Appendix, p. 1041. <sup>6</sup> See Appendix, p. 1041. <sup>7</sup> See Appendix, p. 1041.





11. The Dorsal Artery of the Foot. This artery is the continuation of the posterior tibial artery, and is the main source of the arterial supply to the foot. It gives off the following branches:—  
 (a) The Dorsal Rete of the Foot, which is a network of arteries situated on the dorsum of the foot, and which gives off the following branches:—  
 (i) The Dorsal Interosseous Arteries, which run along the interosseous spaces of the metatarsal bones, and give off the following branches:—  
 (1) The Dorsal Digital Arteries, which run along the sides of the toes, and give off the following branches:—  
 (a) The Arteries of the Toes, which supply the soft parts of the toes.  
 (b) The Arteries of the Nails, which supply the nail beds.  
 (c) The Arteries of the Skin, which supply the skin of the toes.  
 (2) The Arteries of the Plantar Arch, which supply the plantar arch of the foot.  
 (3) The Arteries of the Deep Plantar Arch, which supply the deep plantar arch of the foot.  
 (4) The Arteries of the Metatarsal Arches, which supply the metatarsal arches of the foot.  
 (5) The Arteries of the Dorsal Rete, which supply the dorsum of the foot.  
 (ii) The Arteries of the Tarsal Rete, which are situated on the tarsal bones, and give off the following branches:—  
 (1) The Arteries of the Tarsal Bones, which supply the tarsal bones.  
 (2) The Arteries of the Tarsal Ligaments, which supply the tarsal ligaments.  
 (3) The Arteries of the Tarsal Muscles, which supply the tarsal muscles.  
 (4) The Arteries of the Tarsal Nerves, which supply the tarsal nerves.  
 (5) The Arteries of the Tarsal Skin, which supply the skin of the tarsal region.  
 (6) The Arteries of the Tarsal Bones, which supply the tarsal bones.  
 (7) The Arteries of the Tarsal Ligaments, which supply the tarsal ligaments.  
 (8) The Arteries of the Tarsal Muscles, which supply the tarsal muscles.  
 (9) The Arteries of the Tarsal Nerves, which supply the tarsal nerves.  
 (10) The Arteries of the Tarsal Skin, which supply the skin of the tarsal region.

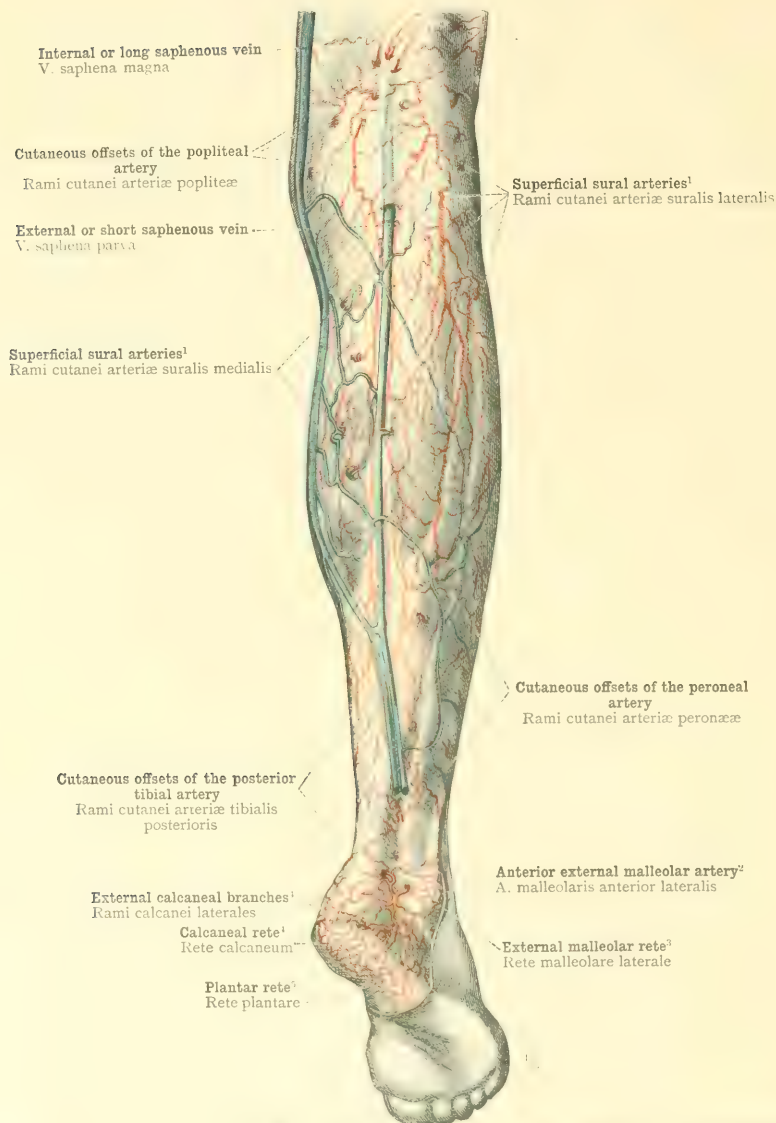
<sup>1</sup> See Appendix, note 232.<sup>2</sup> See Appendix, note 233.<sup>3</sup> See Appendix, note 234.<sup>4</sup> See Appendix, note 235.<sup>5</sup> See Appendix, note 236.

FIG. 1044.—THE SUBCUTANEOUS ARTERIES OF THE CALF AND OF THE POPLITEAL REGION IN ADDITION TO PORTIONS OF THE INTERNAL OR LONG AND THE EXTERNAL OR SHORT SAPHENOUS VEINS (VENA SAPHENA MAGNA ET VENA SAPHENA PARVA); THE CALCANEAL AND MALLEOLAR RETIA; THE POSTERIOR PORTION OF THE PLANTAR RETE. RIGHT LEG AND FOOT; SEEN FROM BEHIND AND THE OUTER SIDE.

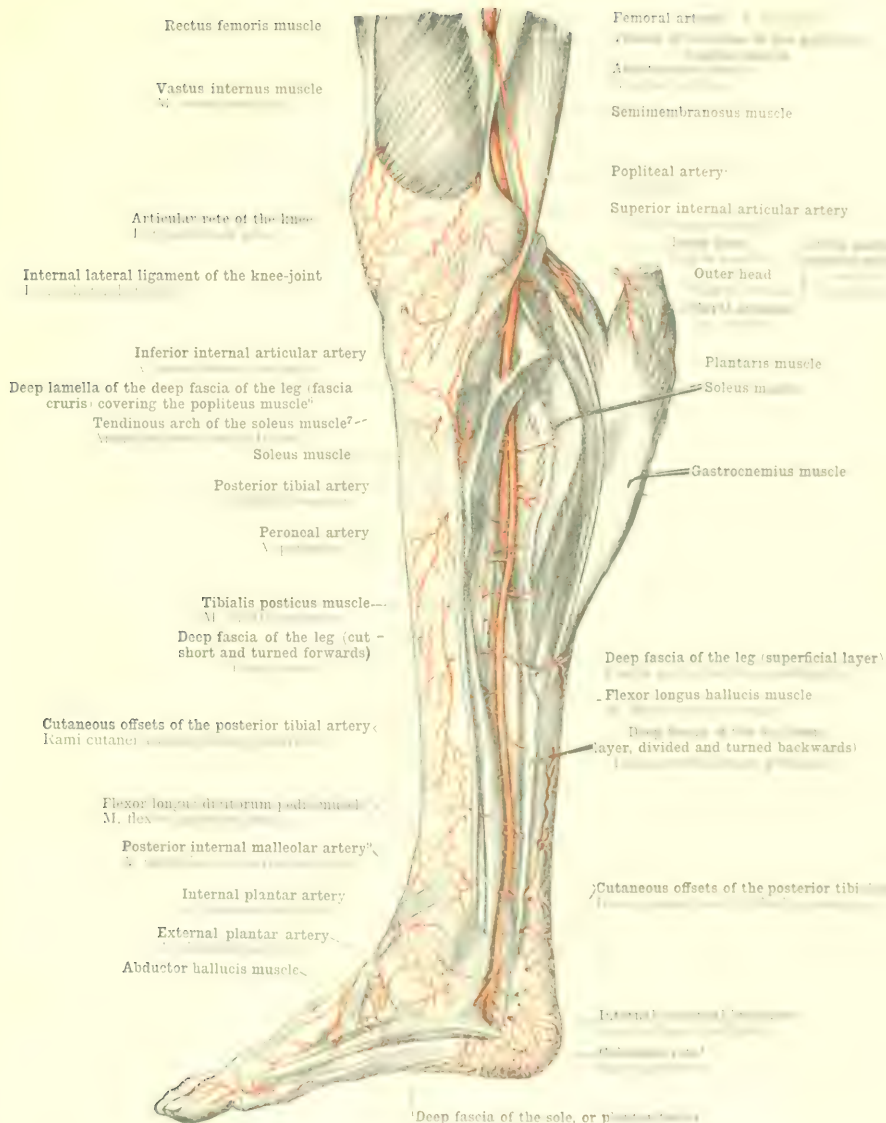


FIG. 145.—THE POSTERIOR ASPECT OF THE RIGHT LEG AND FOOT. (From the dissection of the right leg and foot.)

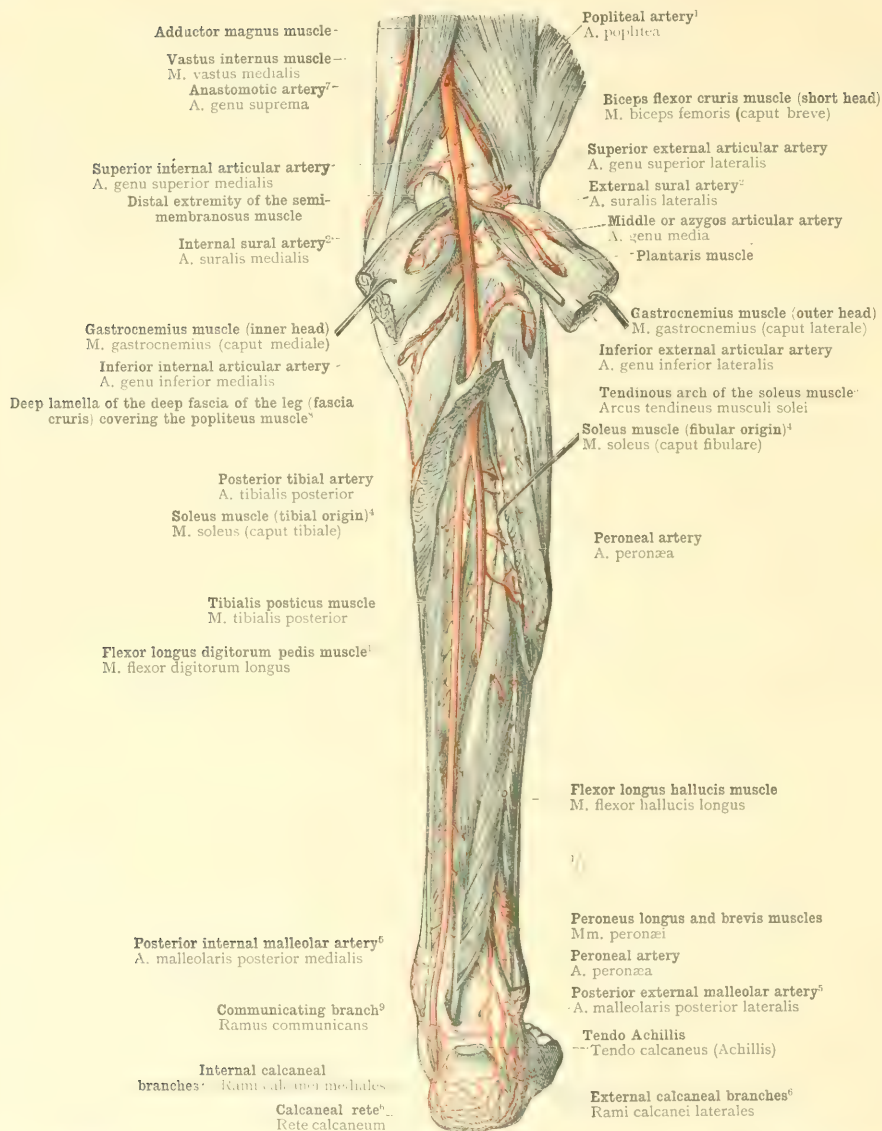
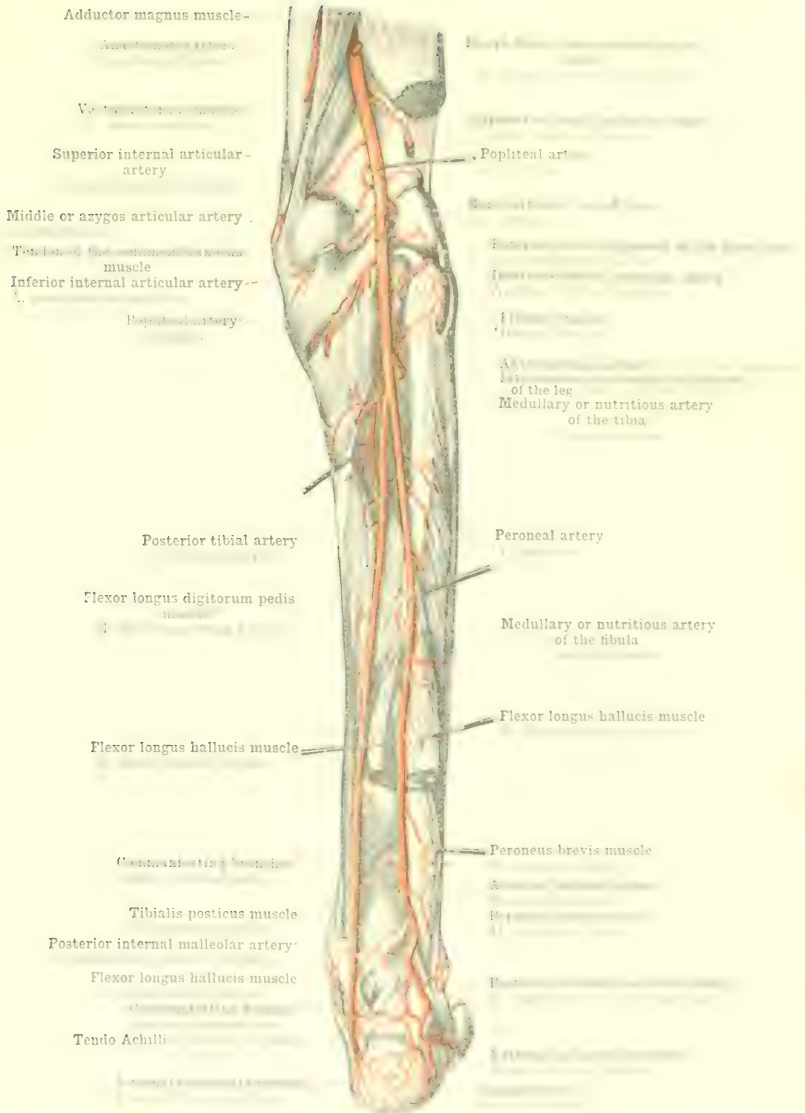


FIG. 1046.—THE POPLITEAL ARTERY, ARTERIA POPLITEA; ITS PASSAGE THROUGH THE \*POPLITEAL CANAL, CANALIS POPLITEUS (see Appendix, note <sup>24</sup>); THE POSTERIOR TIBIAL ARTERY AND THE PERONEAL ARTERY. RIGHT LEG AND FOOT, SEEN FROM BEHIND.





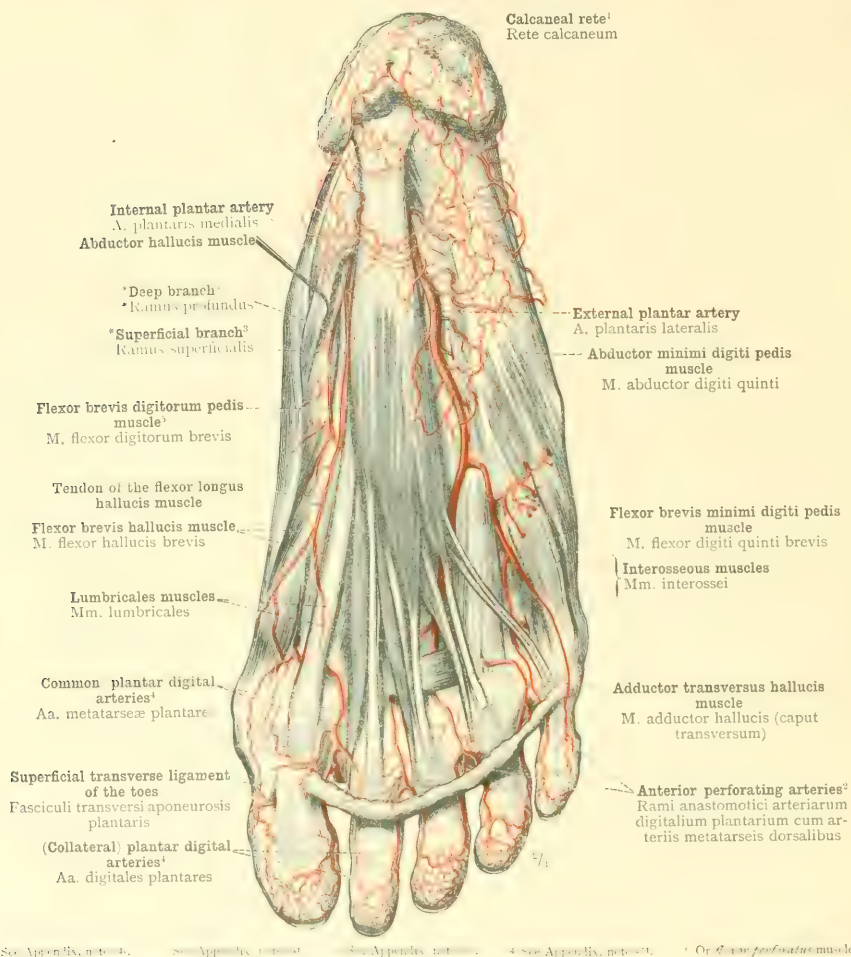


FIG. 1048—SUPERFICIAL ARTERIES OF THE SOLE OF THE FOOT: THE CALCANEAL RETE, RETE CALCANEUM (see Appendix, note 1<sup>1</sup>), AND PART OF THE PLANTAR PLEXUS (see Appendix, note 1<sup>2</sup>); THE INTERNAL PLANTAR ARTERY, ARTERIA PLANTARIS LATERALIS, AND ITS \*SUPERFICIAL DISTRIBUTION; THE INTERNAL PLANTAR ARTERY, ARTERIA PLANTARIS MEDIALIS, AND ITS DIVISION INTO \*SUPERFICIAL AND \*DEEP BRANCHES, \*RAMUS SUPERFICIALIS ET \*RAMUS PROFUNDUS (see Appendix, note 2<sup>1</sup>); THE COMMON PLANTAR DIGITAL ARTERIES, ARTERIÆ DIGITALES PLANTARES (see Appendix, note 2<sup>2</sup>); THE COLLATERAL PLANTAR DIGITAL ARTERIES, ARTERIÆ DIGITALES PLANTARES (see Appendix, note 2<sup>3</sup>), AND THE ANTERIOR PERFORATING ARTERIES (see Appendix, note 2<sup>4</sup>), PLANTAR ASPECT OF THE RIGHT FOOT.

The deep fascia of the sole or plantar fascia (aponeurosis plantaris) was removed, except for the superficial transverse ligament of the toes (fasciculi transversi aponeurosis plantaris); in the heel, the subcutaneous pad of fat was left intact.

#### Arteries of the Sole of the Foot.

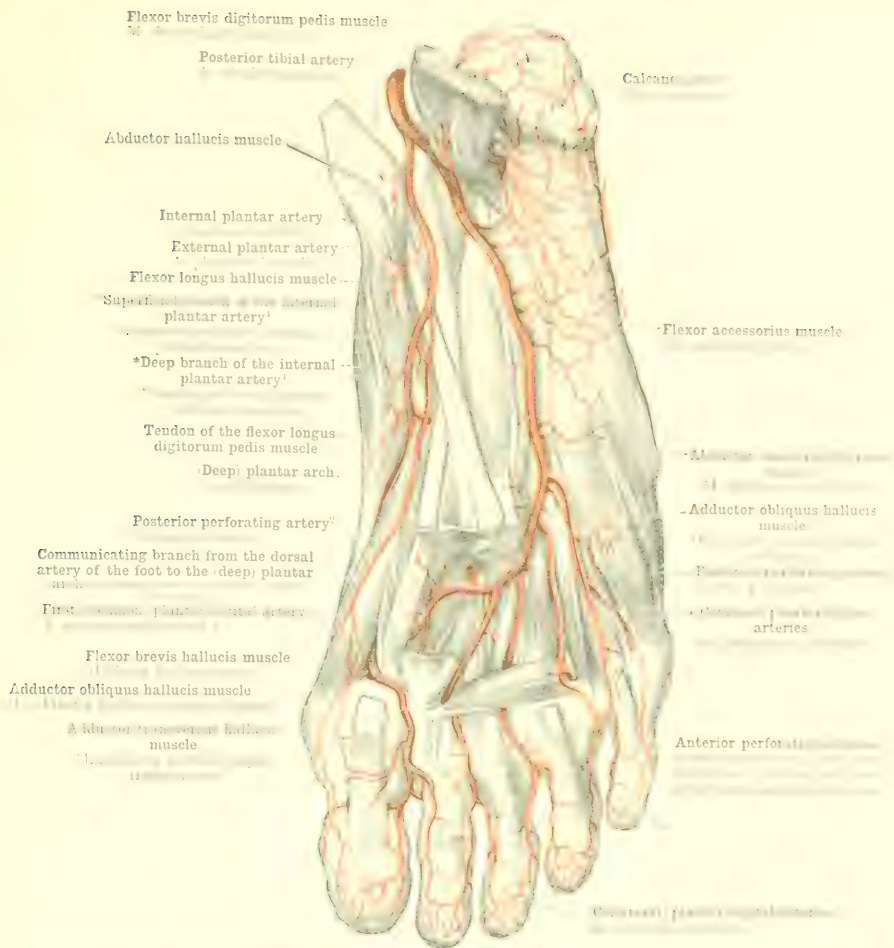


FIG. 10. DEEP ARTERIES OF THE SOLE OF THE RIGHT FOOT. (From the collection of the University of Chicago.)

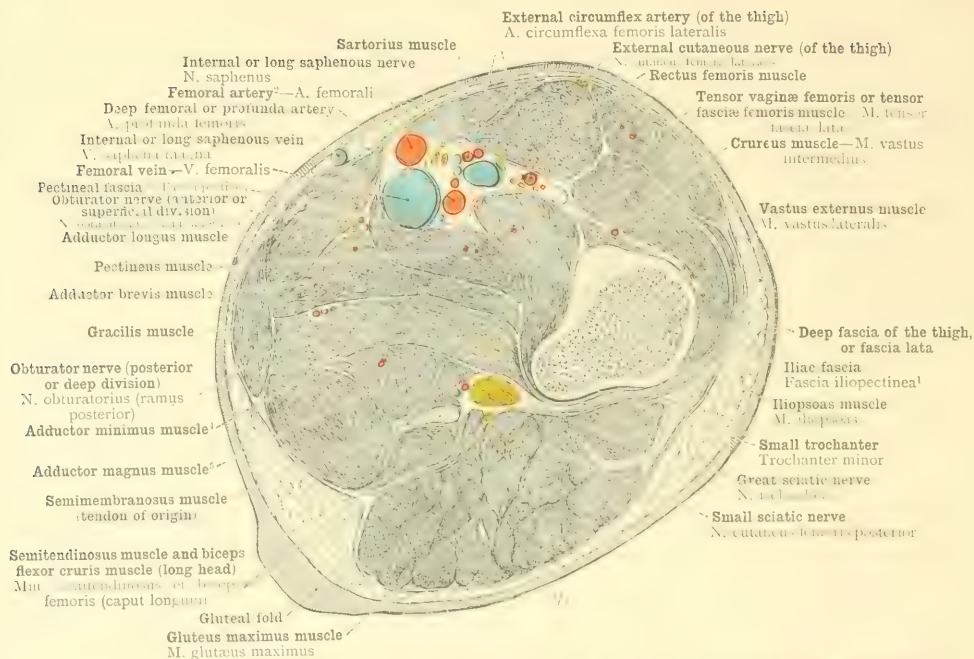


FIG. 1059. TRANSVERSE SECTION THROUGH THE RIGHT THIGH AT THE LEVEL OF THE SMALL TROCHANTER: UPPER SEGMENT OF LOWER LIMB.

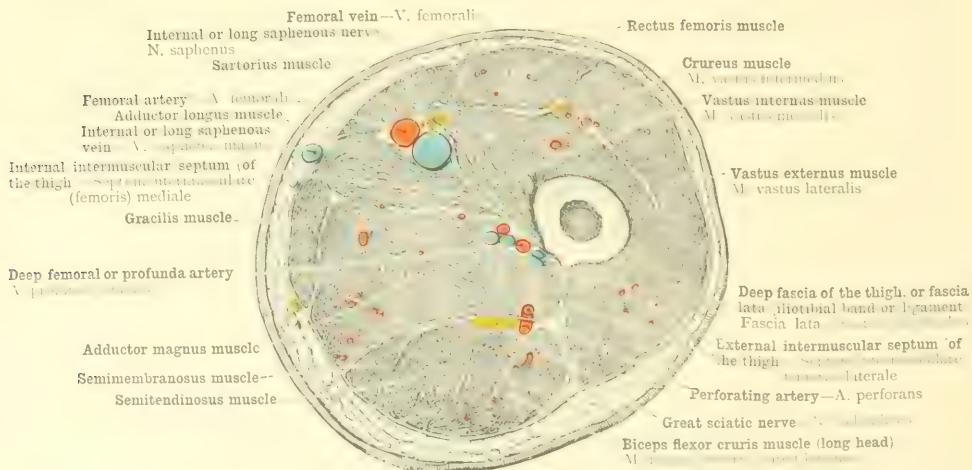


FIG. 1060. TRANSVERSE SECTION THROUGH THE RIGHT THIGH, A LITTLE ABOVE THE MIDDLE OF THE UPPER SEGMENT OF LOWER LIMB.



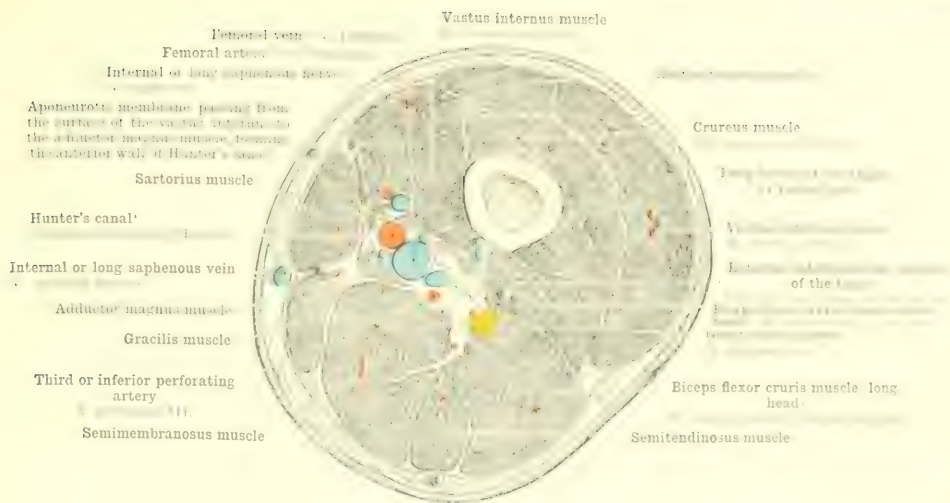


FIG. 104.—TRANSVERSE SECTION THROUGH THE RIGHT THIGH, LEVEL WITH THE MID-POINT OF THE MUSCLE FIBRES, WHERE THE FEMORAL VEIN AND THE FEMORAL NERVE (HUNTER'S CANAL) ARE IN CONTACT WITH THE MUSCLES.

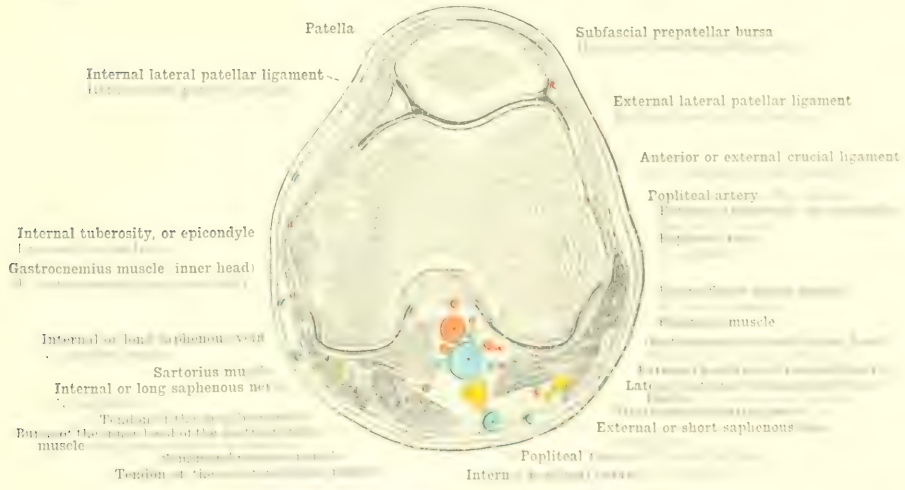


FIG. 105.—TRANSVERSE SECTION THROUGH THE RIGHT KNEE, LEVEL WITH THE TUBEROSITY OF THE PATELLA.

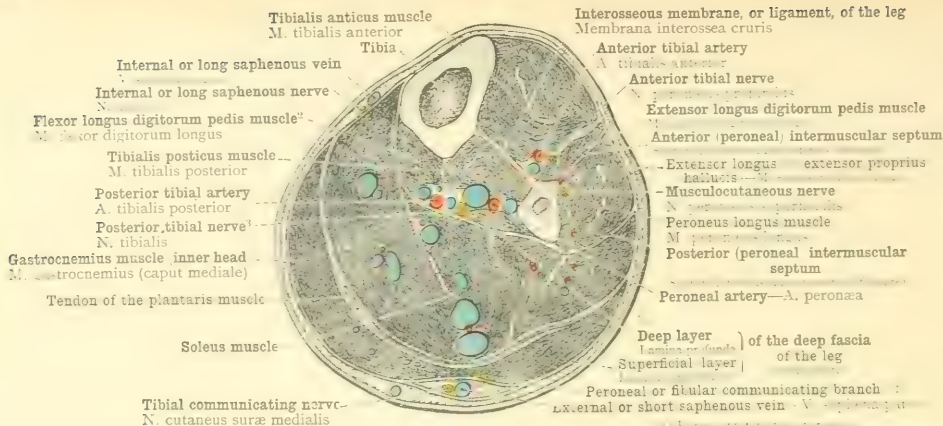


FIG. 1054.—TRANSVERSE SECTION THROUGH THE RIGHT LEG, A LITTLE ABOVE THE MIDDLE; UPPER SURFACE OF LOWER SEGMENT.

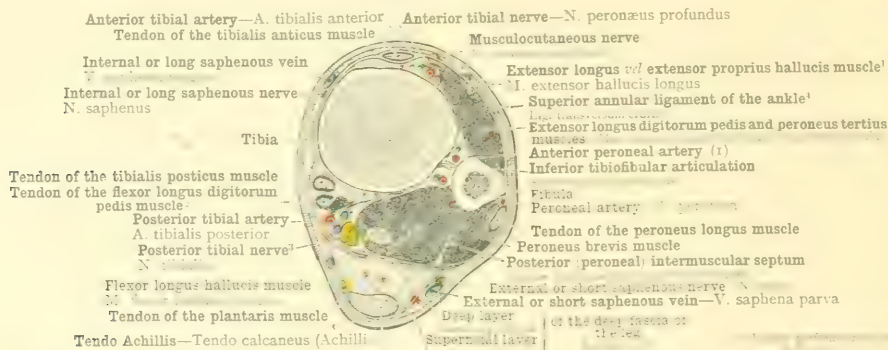


FIG. 1055.—TRANSVERSE SECTION THROUGH THE RIGHT LEG, JUST ABOVE THE ANKLE-JOINT: UPPER SURFACE.

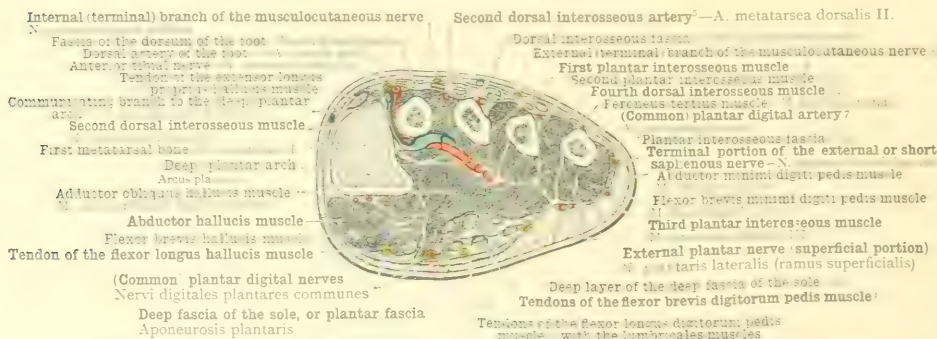


FIG. 1056.—TRANSVERSE SECTION THROUGH THE RIGHT FOOT, JUST ABOVE THE MIDDLE OF THE FIRST METATARSAL BONE; SUPERFICIAL OF DISTAL SEGMENT.

VENÆ TRUNCI

THE VEINS OF THE TRUNK

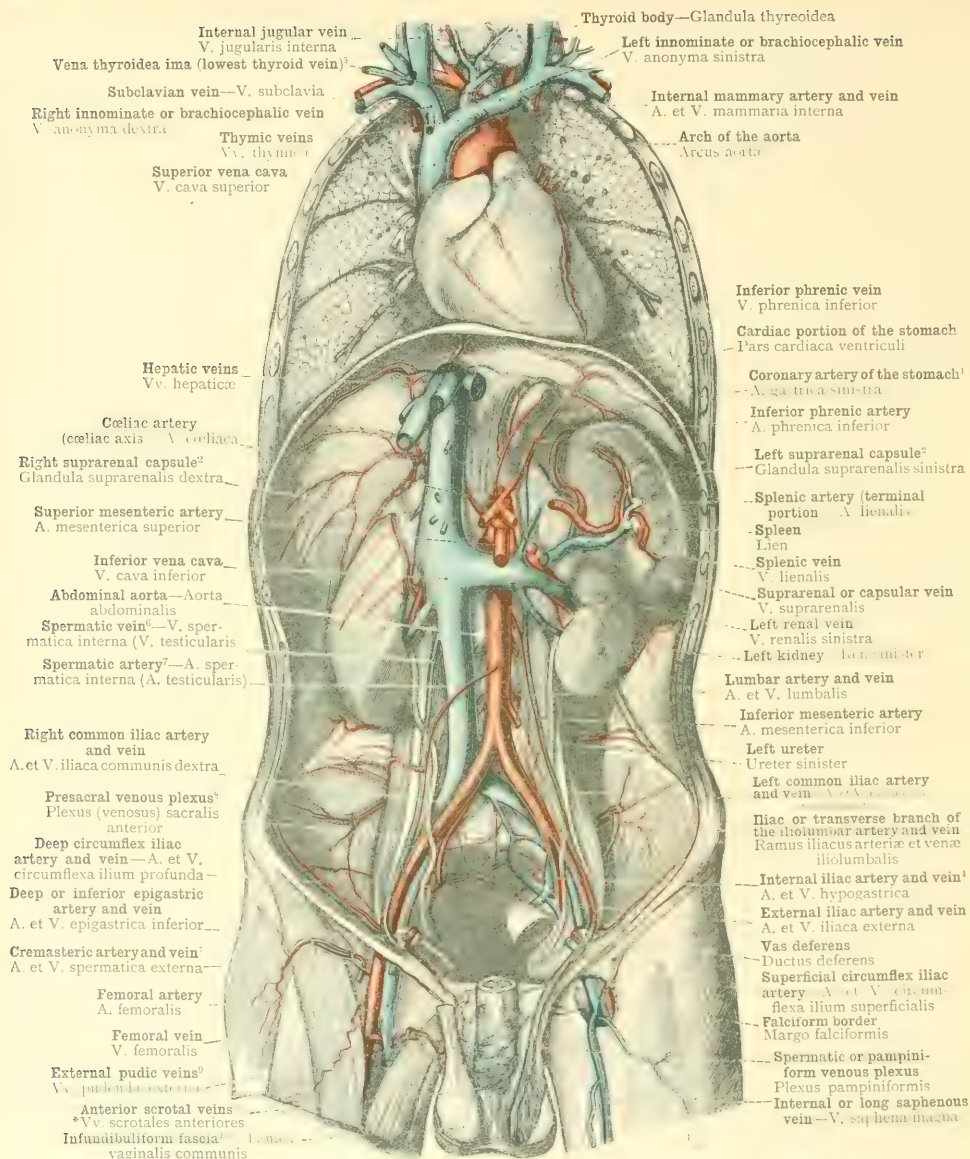
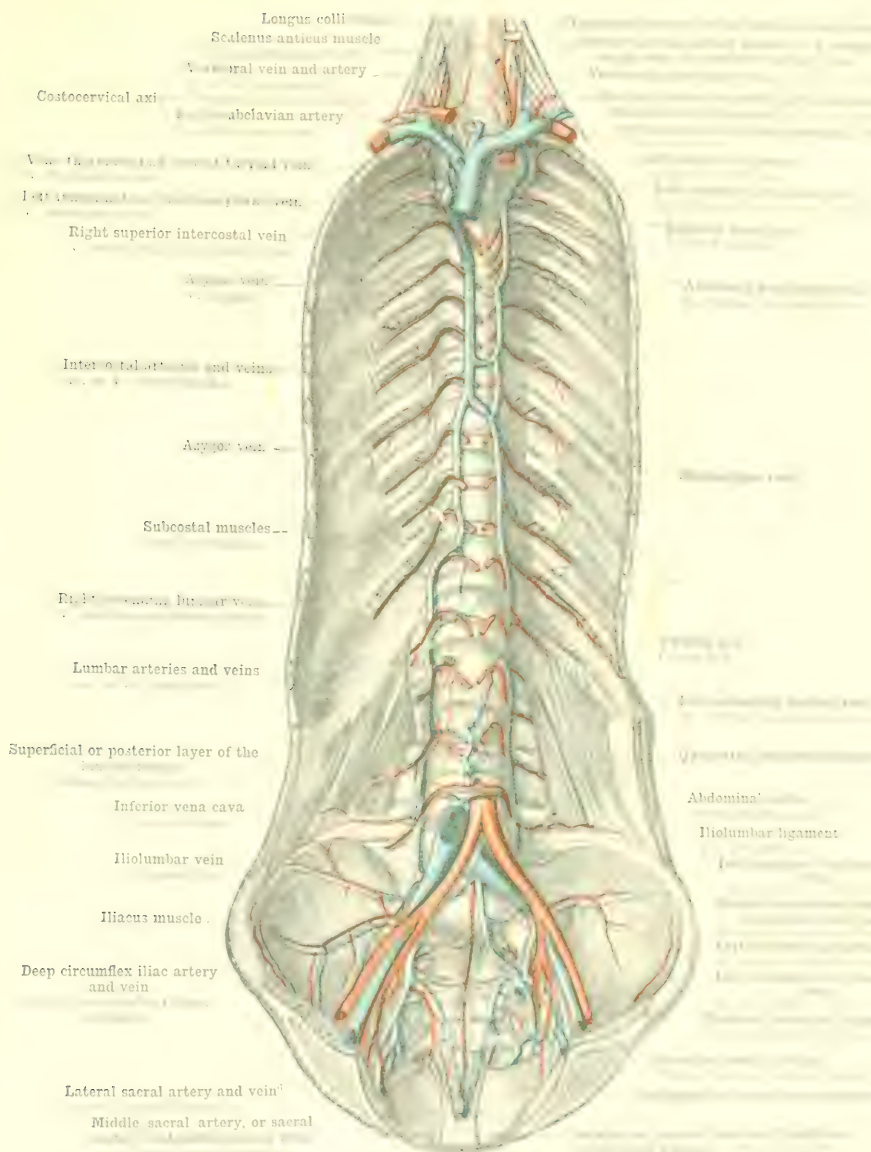


FIG. 1057.—THE SUPERIOR AND THE INFERIOR VENA CAVA; THE PARIETAL AND THE VISCERAL TRIBUTARIES, RADICES FORMED BY THE UNION OF THE LATTER. THE ABDOMINAL AORTA, AORTA ABDOMINALIS. SPLEN FROM P. FORE.

The System of the Superior and the Inferior Venæ Cavæ.





Right superior intercostal vein  
V. intercostalis suprema dextra

Left innominate or brachiocephalic vein  
V. anonyma sinistra

Thoracic duct  
Ductus thoracicus  
Left subclavian artery  
A. subclavia sinistra  
Left superior intercostal vein  
V. intercostalis suprema sinistra

Right innominate or brachiocephalic vein  
V. anonyma dextra  
Vena thyroidea ima lowest thyroid vein

Trachea

Superior vena cava  
V. cava superior

Right bronchus  
Left bronchus

Thoracic duct - Ductus thoracicus

Accessory hemiazygos vein  
V. hemiazygos accessoria

Azygos vein<sup>1</sup> Azygos vein<sup>1</sup>

Intercostal arteries and veins  
Arteriae et venae intercostales

Hemiazygos vein<sup>1</sup> opening into the azygos vein<sup>1</sup>

Azygos vein<sup>1</sup> Hemiazygos vein<sup>1</sup>

Descending thoracic aorta  
Aorta descendens

Aortic opening of the diaphragm  
Hiatus aorticus diaphragmatis

Lumbar arteries and veins  
Aa. et Vv. lumbales

Ascending lumbar vein  
V. lumbalis ascendens

Inferior vena cava  
Vena cava inferior

Left common iliac vein  
Vena iliaca communis sinistra

Iliolumbar vein - Vena iliolumbalis

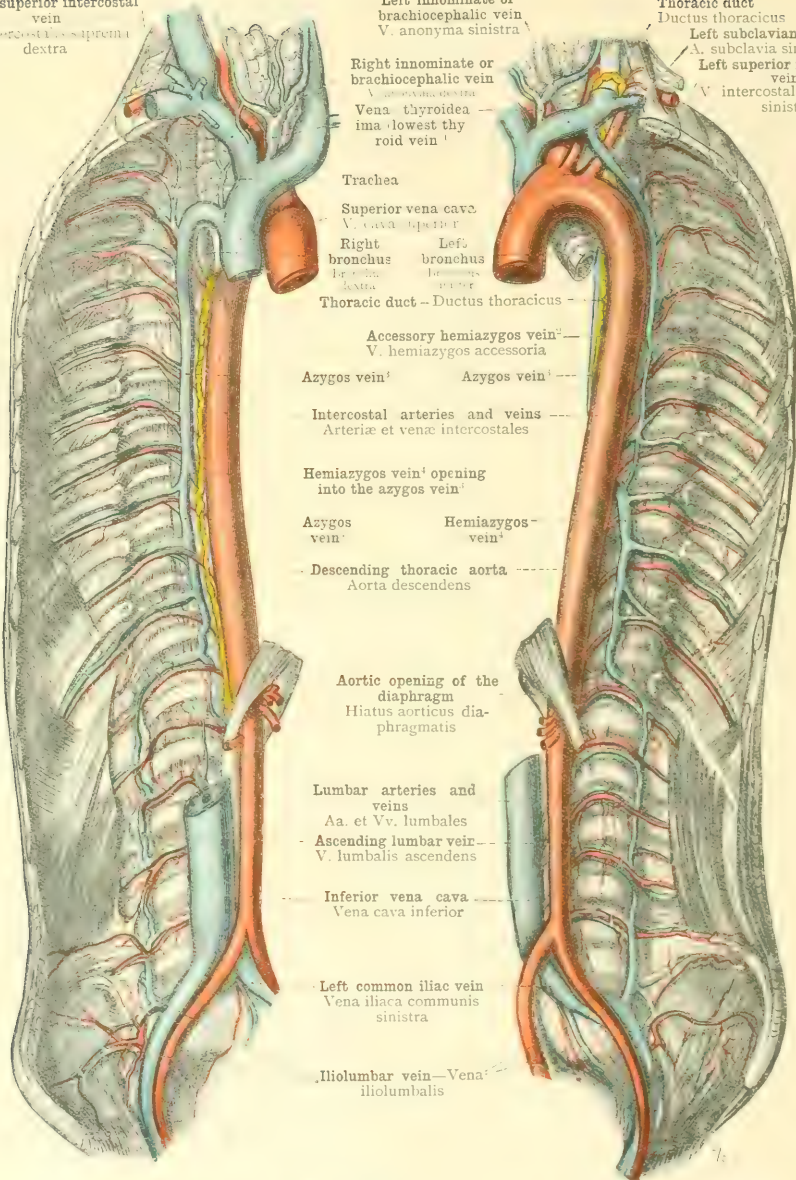
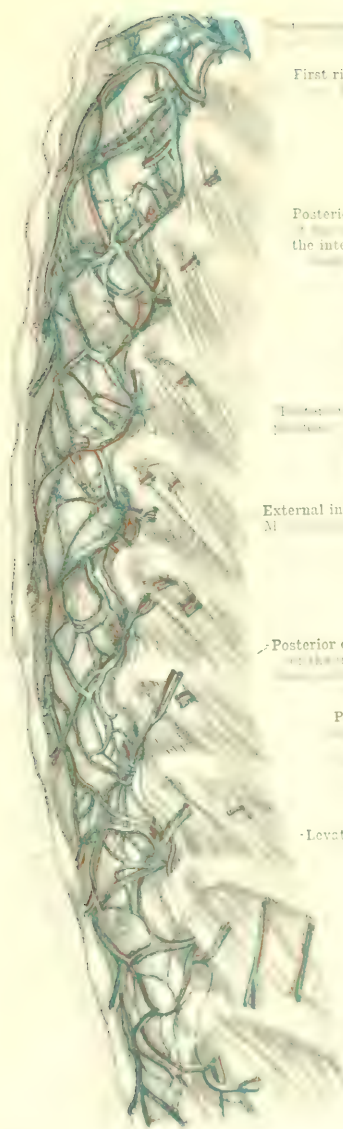


FIG. 1059.—SEEN FROM THE RIGHT SIDE.

FIG. 1060.—SEEN FROM THE LEFT SIDE.

### The System of the Azygos and Hemiazygos Veins.



First rib

twelfth dorsal v

Posterior or dorsal bra  
the intercostal arterie

External intercostal muscle

Posterior or dorsal divisions

thum

Posterior or dorsal branche  
veins

Levator costae muscle





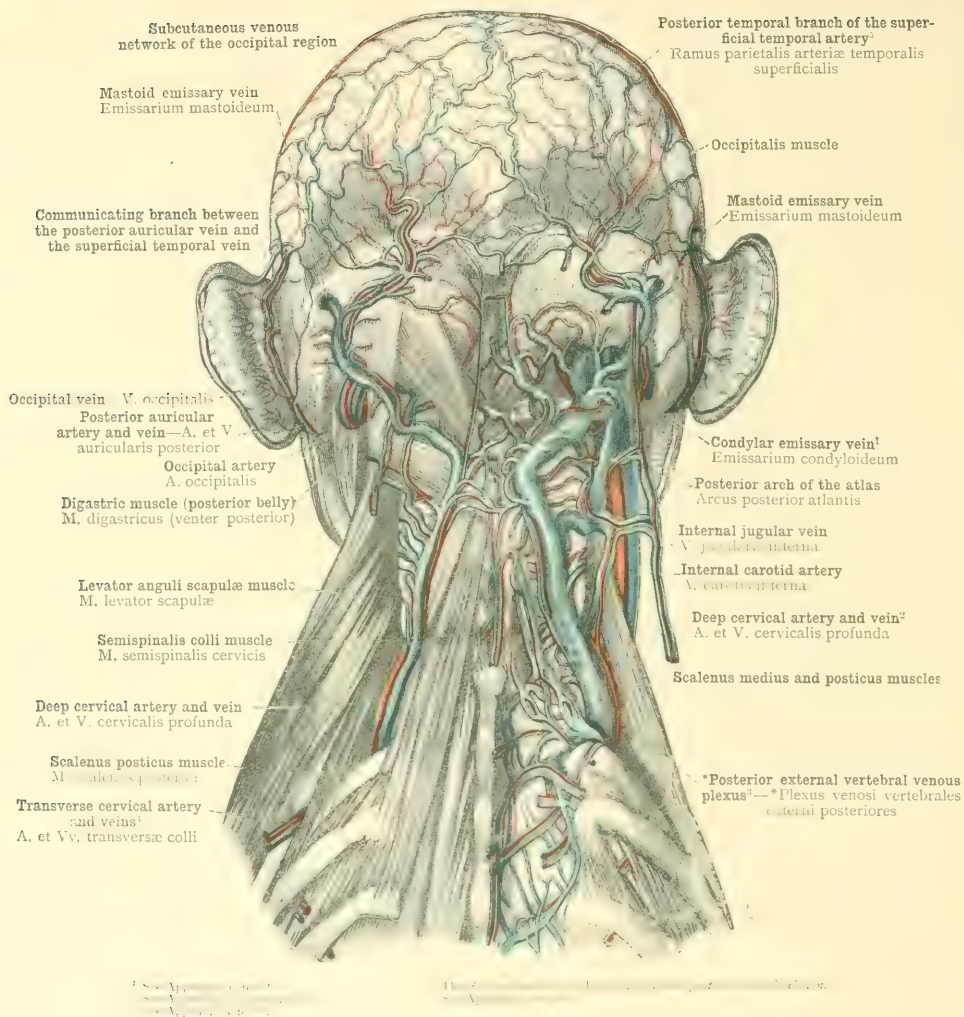


FIG. 163. THE VEINS OF THE OCCIPITAL REGION AND THE DEEP VEINS OF THE BACK OF THE NECK, SEEN FROM BEHIND: THE SUBCUTANEOUS VENOUS NETWORK OF THE OCCIPITAL REGION; THE OCCIPITAL VEIN, VENA OCCIPITALIS, CONTINUOUS BELOW WITH THE DEEP CERVICAL VEIN, VENA CERVICALIS PROFUNDA; THE MASTOID EMISSARY VEIN, EMISSARIUM MASTOIDEUM, AND THE CONDYLAR EMISSARY VEIN, EMISSARIUM CONDYLOIDEUM (see Appendix, note 201); THE \*POSTERIOR EXTERNAL VERTEBRAL VENOUS PLEXUS, \*PLEXUS VENOSI VERTEBRALES EXTERNI POSTERIORES (see Appendix, notes 229 and 209); THE POSTERIOR AURICULAR VEIN, VENA AURICULARIS POSTERIOR.

On the right side these muscles also were removed, and the \*posterior external vertebral venous plexus was exposed.

### The Deep Veins of the Nuchal and Occipital Regions.



Torcular Herophili, or confluence  
of the veins

Internal jugular vein

Common carotid vein

Subclavian vein

Venous plexus surrounding the  
vertebral artery, continued into  
the vertebral vein

Spinal dura mater

\*Posterior internal vertebral  
venous plexus

Deep cervical vein

-Venous rete of the intervertebral  
foramen

\*Intervertebral veins

Articular surface of the tubercle of the  
second rib

Articularis tubi

Cut surface of one of the  
neural arches  
Neck of rib

Tubercle of rib

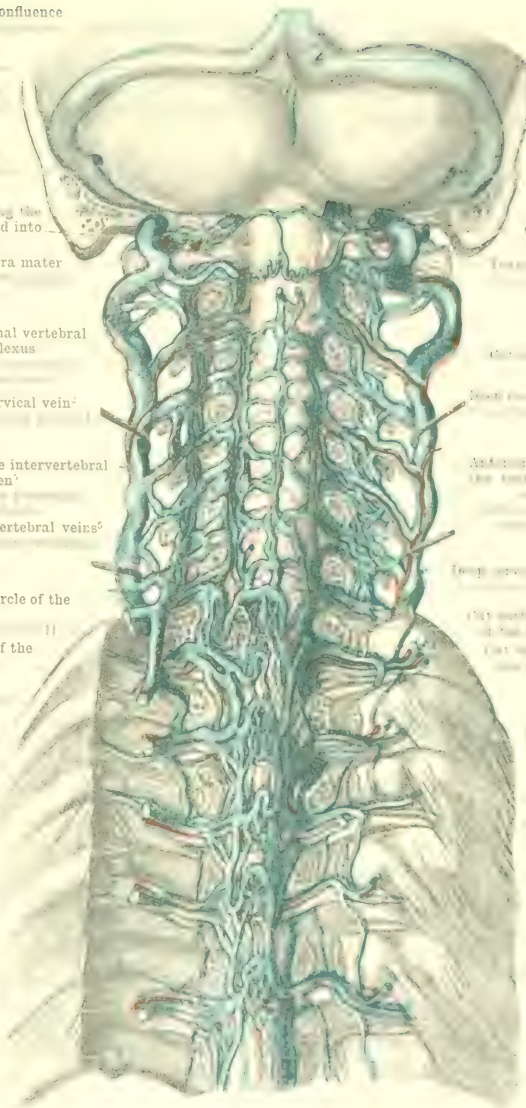
External intercostal  
muscles

Intervertebral vein

Posterior or internal inter-  
costal aponeuroses

Posterior or dorsal divisions  
of the intercostal arterial  
vein

Neck of the 11th rib



Posterior internal vertebral vein

Common carotid vein

Deep cervical vein

Articular surface of the tubercle of the second rib

Articularis tubi

Cut surface of one of the neural arches

Neck of rib

Tubercle of rib

External intercostal muscles

Intervertebral vein

Posterior or internal intercostal aponeuroses

Posterior or dorsal divisions of the intercostal arterial vein

Neck of the 11th rib

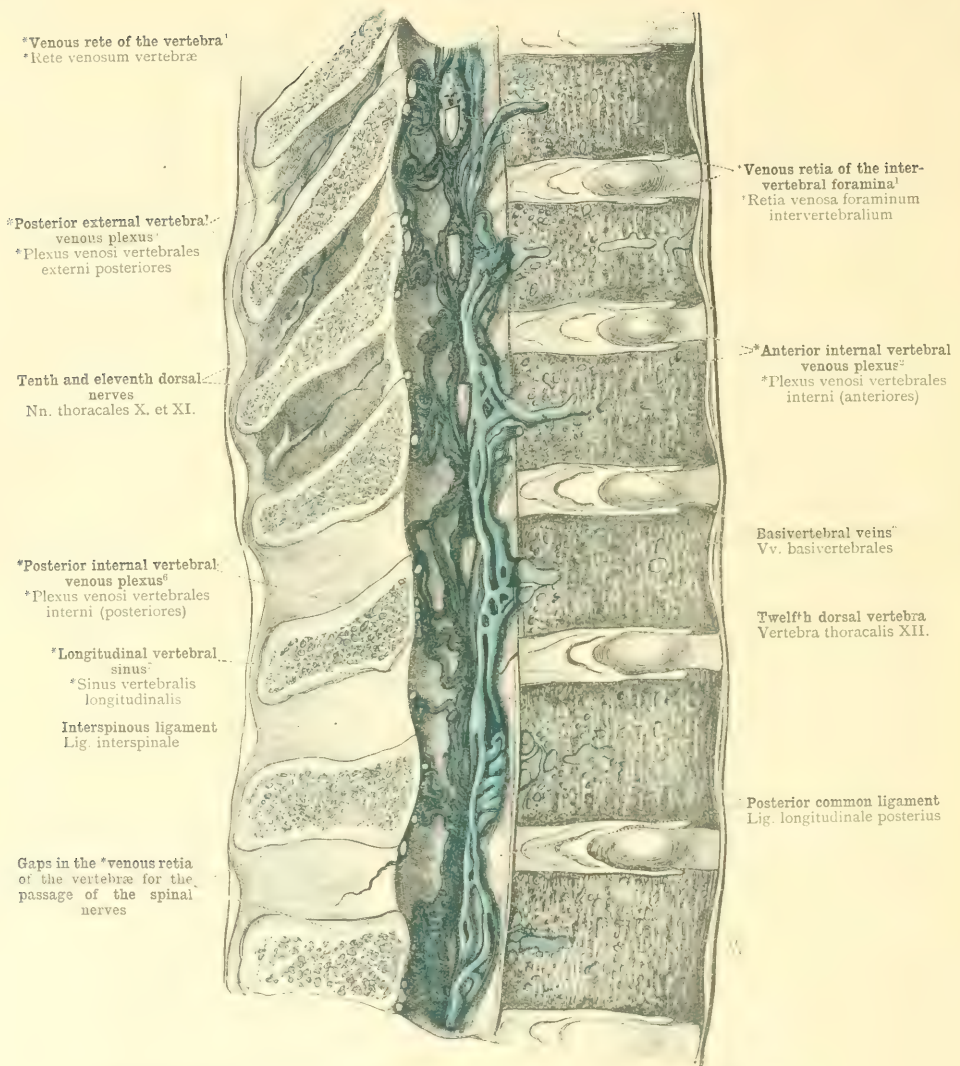


FIG. 1065.—THE \*INTERNAL VERTEBRAL VENOUS PLEXUSES. \*PLEXUS VENOSI VERTEBRALES INTERNI. The illustration shows the internal vertebral venous plexuses, the venous rete of the vertebrae, the venous retia of the intervertebral foramina, the basivertebral veins, the longitudinal vertebral sinus, the interspinous ligament, and the posterior common ligament, and their relation to the emerging roots of the spinal nerves.

The illustration is composed from the dissection of two human specimens. Portions of the posterior external vertebral venous plexus have also been exposed.

**Plexus venosi vertebrales interni**—The internal vertebral venous plexus.



Cutaneous offsets of the superficial cervical artery

Rami cutanei arteriæ cervicalis superficialis

Cutaneous offsets of the suprascapular artery<sup>1</sup>—Rami cutanei arteriæ transverse scapulae

Cutaneous offset of the posterior circumflex artery of the arm<sup>2</sup>

Cutaneous offset of the dorsal branch of the subscapular artery<sup>3</sup>—Ramus cutaneus arteriæ circumflexæ scapulae

(Outer) dorsal cutaneous branches of the intercostal and lumbar arteries—Rami cutanei dorsales (laterales) arteriarum intercostalium et lumbalium

Lateral cutaneous branches of the intercostal arteries<sup>1</sup>  
Rami cutanei laterales arteriarum intercostalium

Cutaneous offsets of the gluteal artery  
Rami cutanei arteriæ glutææ superioris

Cutaneous offsets of the sciatic artery  
Rami cutanei arteriæ glutææ inferioris

Cutaneous offset of the first or superior perforating artery  
Ramus cutaneus arteriæ perforantis primæ

Inner: dorsal cutaneous branches of the intercostal arteries—Rami cutanei dorsales (mediales) arteriarum intercostalium

Inner: dorsal cutaneous branches of the lumbar arteries  
Rami cutanei dorsales (mediales) arteriarum lumbalium

Cutaneous offsets of the dorsal branches of the lateral sacral arteries

Cutaneous offsets of the inferior hemorrhoidal artery<sup>1</sup> which is itself a branch of the internal pudic artery<sup>2</sup>

FIG. 167.—THE SUBCUTANEOUS ARTERIES AND VEINS OF THE POSTERIOR WALL OF THE TRUNK.

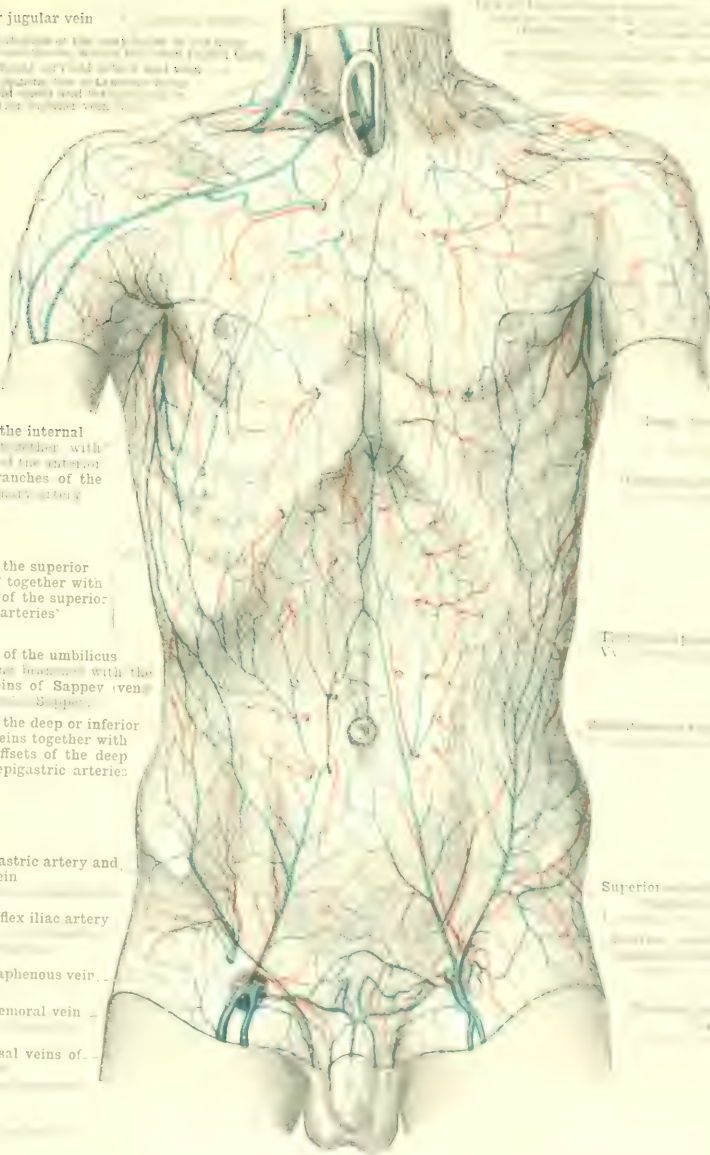
The Subcutaneous Bloodvessels of the Posterior Wall of the Trunk.



Anterior jugular vein

Cutaneous of the neck, formed by the union of the external jugular vein and the superficial epigastric vein. It is the only vein of the neck which is not a branch of the internal jugular vein.

Anterior jugular vein



Tributaries of the internal mammary vein together with cutaneous offshoots of the anterior or perforating branches of the internal mammary artery

Tributaries of the superior epigastric veins together with cutaneous offshoots of the superior epigastric arteries

Venous circle of the umbilicus and communicating branches with the para-umbilical veins of Sappey (venous circle of Sappey)

Tributaries of the deep or inferior epigastric veins together with cutaneous offshoots of the deep or inferior epigastric arteries

Superficial epigastric artery and vein

Superficial circumflex iliac artery and vein

Internal or long saphenous vein

Femoral vein

Subcutaneous dorsal veins of the foot

Superior

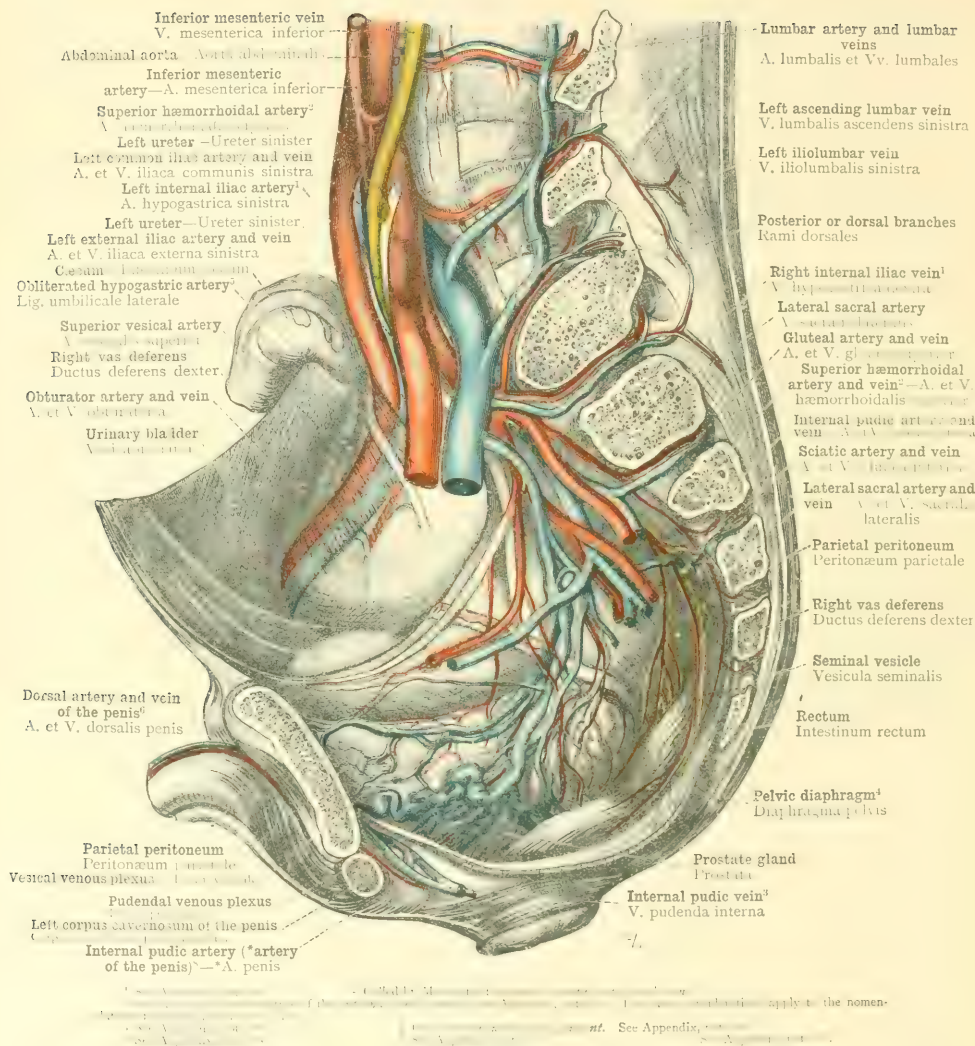
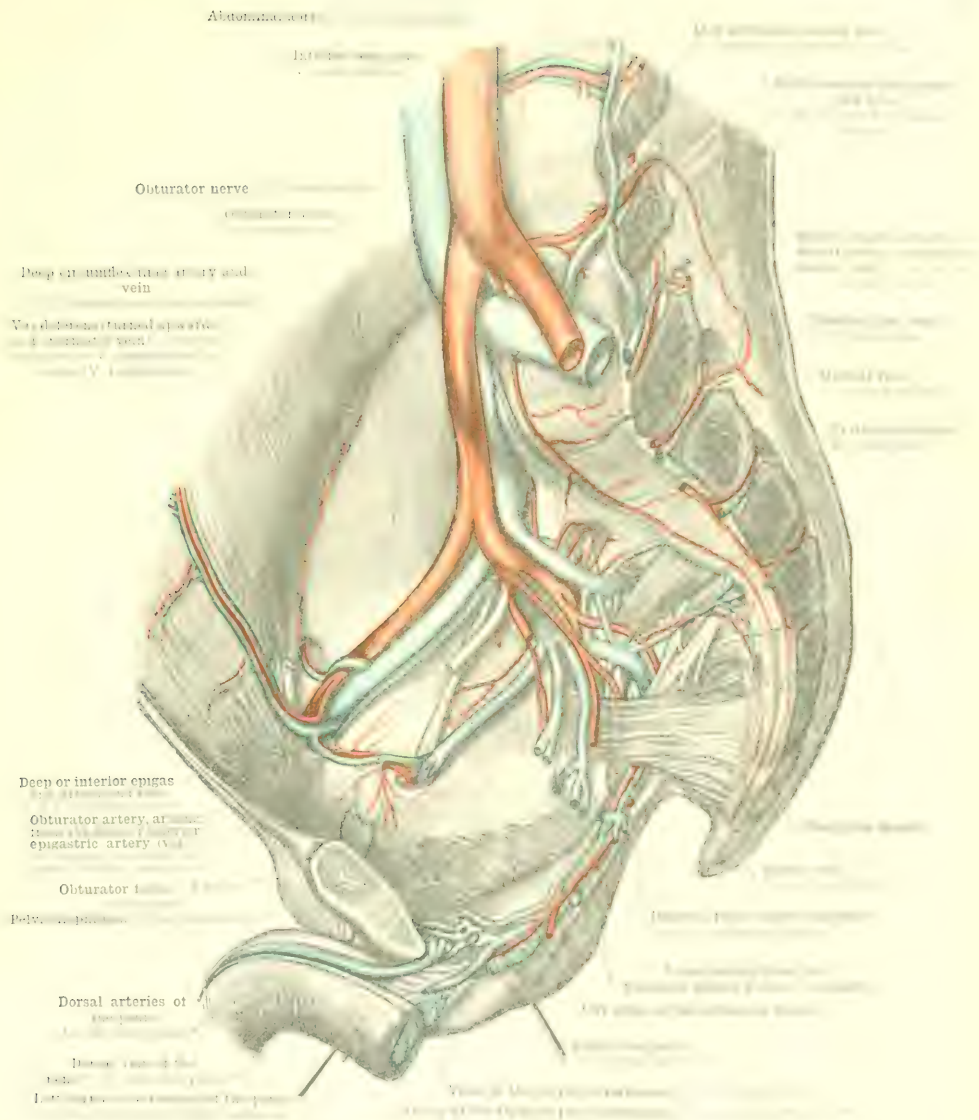


FIG. 1069.—THE VENOUS PLEXUSES OF THE MALE PELVIS; SEEN FROM THE LEFT SIDE.

By a section, which began in front of a tubercle, the left of the median plane, and behind passed through the left row of sacral foramina, the left lateral wall of the pelvis was removed, the parietal peritoneum covering this wall being, however, retained up to the level of its reflection on to the urinary bladder and the rectum. The exposed portions of these organs were exposed, together with the vessels by which they are connected; the pelvic diaphragm (Fig. 1069, A) was cut away close to the rectum and the bladder and drawn slightly downwards. The inferior mesenteric vein has been injected with a yellow material.









Dissected view of the vulva, showing the internal arteries of the clitoris

External view of the vulva, showing the internal arteries of the clitoris with the blood vessels

Clitoris, external view

External view of the vulva

External view of the vulva

External view of the vulva

External view of the vulva

External view of the vulva

External view of the vulva

External view of the vulva

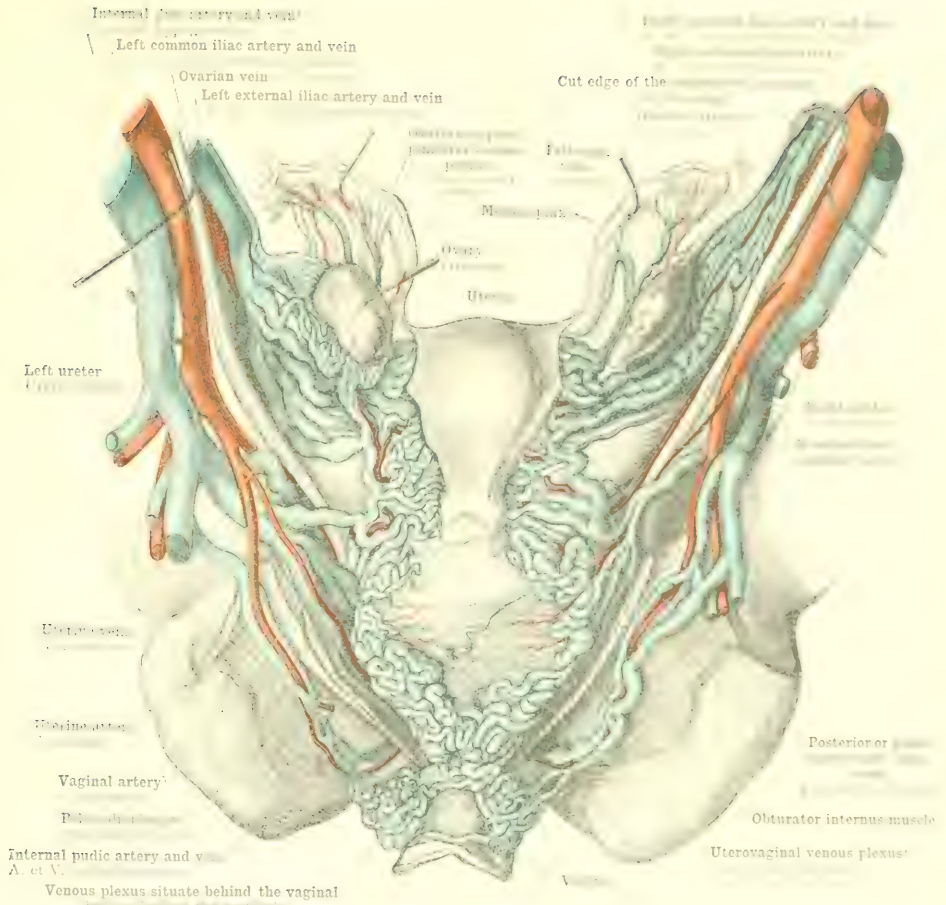
Inferior internal pudic artery

Subcutaneous or external pudic artery

Internal pudic artery and veins

Posterior or great sacros

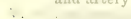
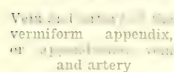
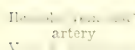
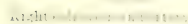
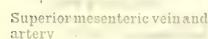
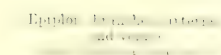












V. mesenteric & superior. The superior mesenteric



VENÆ COLLI ET CAPITIS

THE VEINS OF THE HEAD AND  
NECK

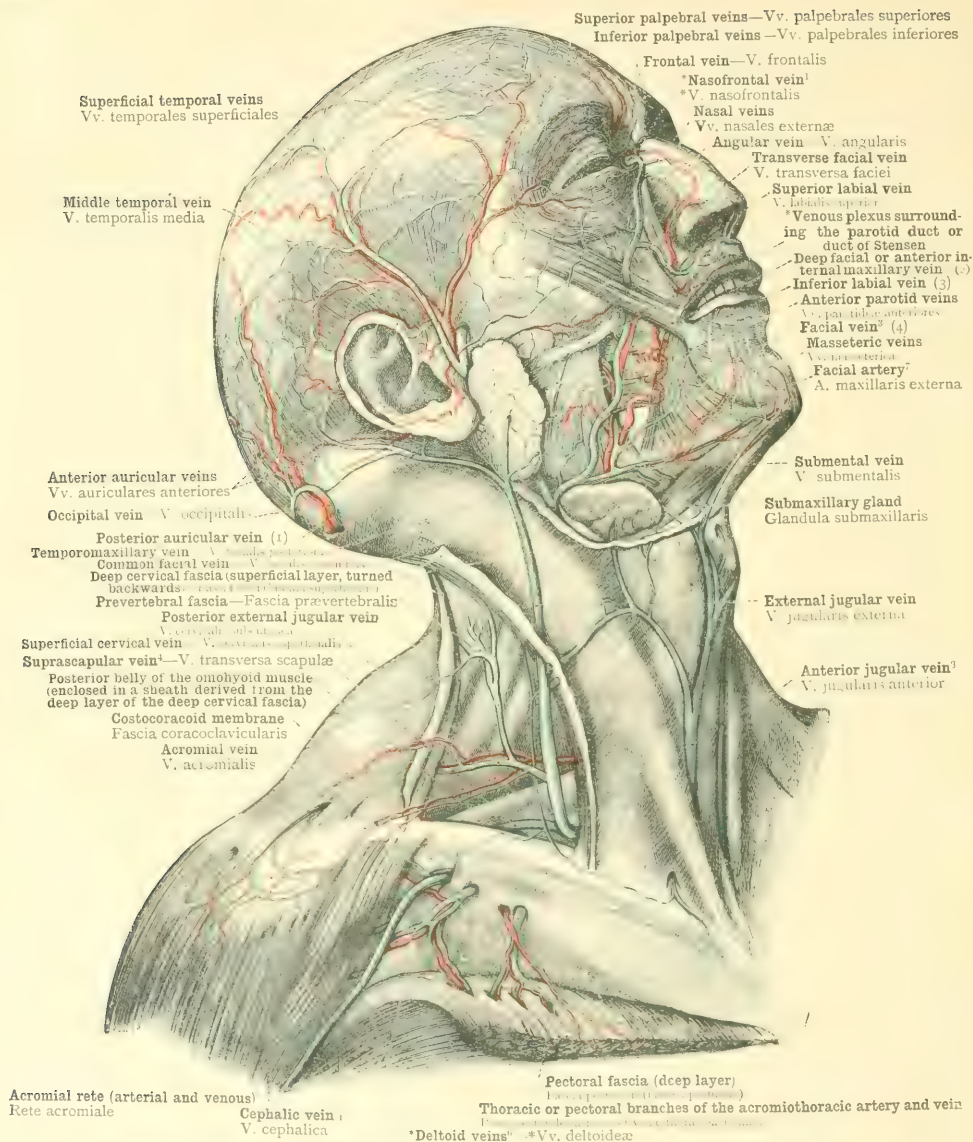
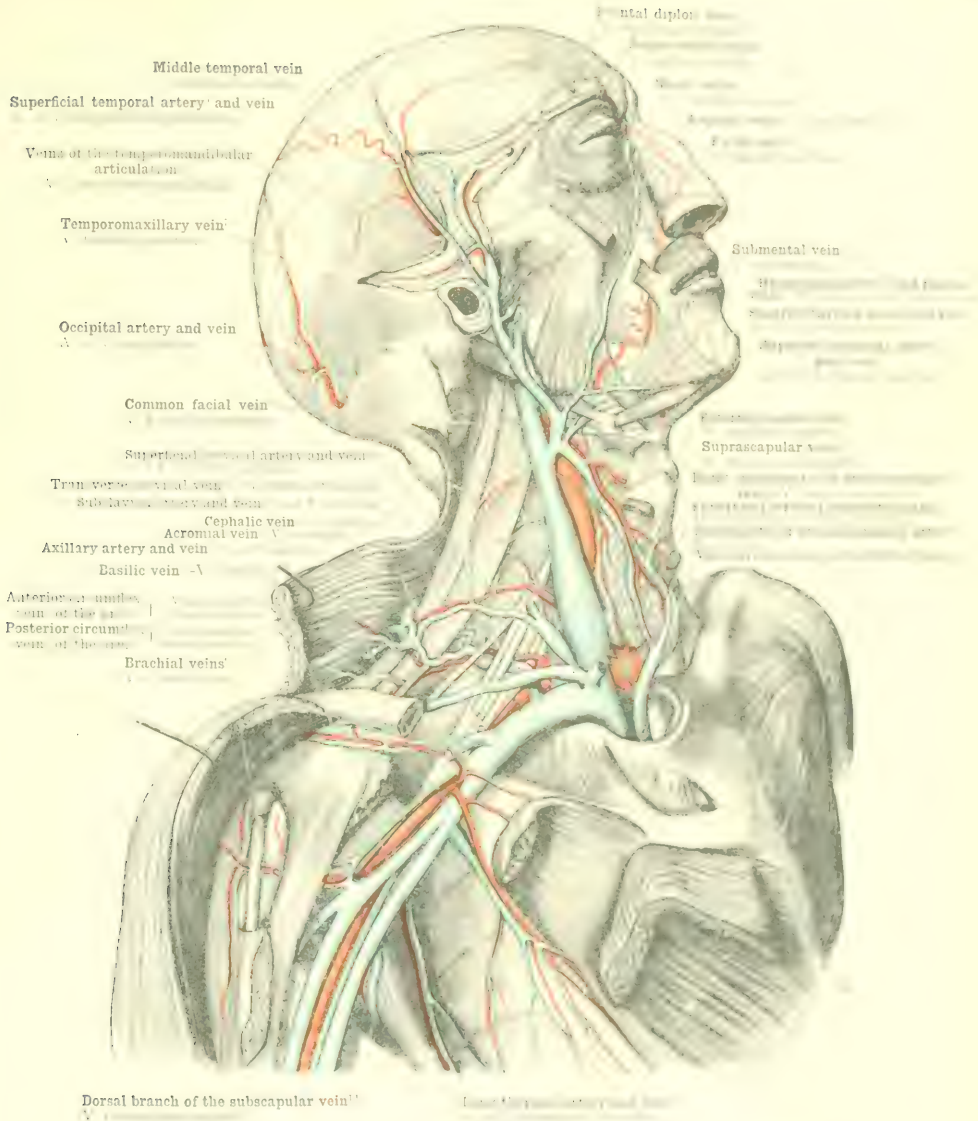


FIG. 1877.—THE SUPERFICIAL VEIN OF THE HEAD AND NECK: THE ORIGIN OF THE FACIAL (OR ANTERIOR FACIAL) VEIN, VENA FACIALIS ANTERIOR, AND THE TEMPOROMAXILLARY (OR POSTERIOR FACIAL) VEIN, VENA FACIALIS POSTERIOR (see Appendix, note 283); THE OCCIPITAL VEIN, VENA OCCIPITALIS; THE ANTERIOR AND EXTERNAL JUGULAR VEINS, VENA JUGULARIS ANTERIOR ET EXTERNA; THE POSTERIOR EXTERNAL JUGULAR VEIN, VENA CERVICALIS SUBCUTANEA.





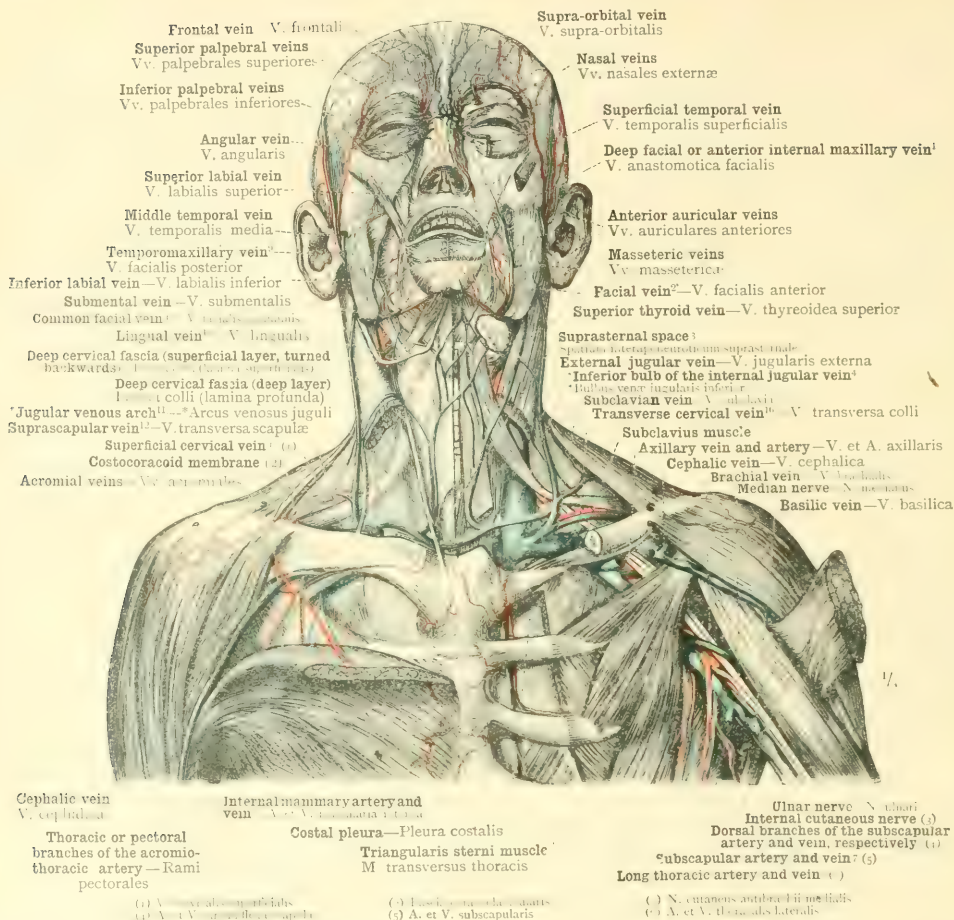


FIG. 1079.—THE SUPERFICIAL VEINS OF THE FACE, THE SUPERFICIAL AND DEEP VEINS OF THE NECK, AND THE VEINS OF THE AXILLA; SEEN FROM BEFORE.

On the right side of the neck, by the removal of the superficial layer of the deep cervical fascia, the \*submassillary fossa (fossa submaxillaris—see note 13 below), the \*greater suprascapular fossa (fossa suprascapularis—see note 14 below), and the suprasternal space (spatium interaponeuroticum suprasternale—see note 15) were opened. The lower half of the right sternocleidomastoid muscle was removed, together with the corresponding portion of the superficial layer of the deep cervical fascia, in order to lay bare the opening of the \*jugular venous arch (see Appendix, note 12) into the terminal portion of the external jugular vein. On the left side of the neck the ensheathing portion of the deep cervical fascia was entirely removed, and the lower half of the sternocleidomastoid muscle was removed, together with the sternal extremity of the clavicle, in order to display the deep venous trunks and the left \*venous angle (\*angulus venosus—see Appendix, note 12). On the right side of the body, the clavicular portion of the pectoralis major muscle has been turned downwards, thus exposing the axillary vein above the pectoralis minor muscle. On the left side of the body, the pectoralis major muscle having been removed, the vessels and nerves of the axilla were dissected out. Further, on this side, by the partial removal of the anterior or external intercostal aponeuroses and of the internal intercostal muscles, the internal mammary vessels were exposed, and their relation to the costal pleura and to the triangularis sterni muscle was displayed.

<sup>1</sup> See Appendix, note 12. <sup>2</sup> See Appendix, note 13. <sup>3</sup> See Appendix, note 14. <sup>4</sup> See Appendix, note 15. <sup>5</sup> See Appendix, note 16. <sup>6</sup> See Appendix, note 17. <sup>7</sup> See Appendix, note 18. <sup>8</sup> See Appendix, note 19. <sup>9</sup> See Appendix, note 20. <sup>10</sup> See Appendix, note 21. <sup>11</sup> See Appendix, note 22. <sup>12</sup> See Appendix, note 23. <sup>13</sup> See Appendix, note 24. <sup>14</sup> See Appendix, note 25. <sup>15</sup> See Appendix, note 26. <sup>16</sup> See Appendix, note 27. <sup>17</sup> See Appendix, note 28. <sup>18</sup> See Appendix, note 29. <sup>19</sup> See Appendix, note 30. <sup>20</sup> See Appendix, note 31. <sup>21</sup> See Appendix, note 32. <sup>22</sup> See Appendix, note 33. <sup>23</sup> See Appendix, note 34. <sup>24</sup> See Appendix, note 35. <sup>25</sup> See Appendix, note 36. <sup>26</sup> See Appendix, note 37. <sup>27</sup> See Appendix, note 38. <sup>28</sup> See Appendix, note 39. <sup>29</sup> See Appendix, note 40. <sup>30</sup> See Appendix, note 41. <sup>31</sup> See Appendix, note 42. <sup>32</sup> See Appendix, note 43. <sup>33</sup> See Appendix, note 44. <sup>34</sup> See Appendix, note 45. <sup>35</sup> See Appendix, note 46. <sup>36</sup> See Appendix, note 47. <sup>37</sup> See Appendix, note 48. <sup>38</sup> See Appendix, note 49. <sup>39</sup> See Appendix, note 50. <sup>40</sup> See Appendix, note 51. <sup>41</sup> See Appendix, note 52. <sup>42</sup> See Appendix, note 53. <sup>43</sup> See Appendix, note 54. <sup>44</sup> See Appendix, note 55. <sup>45</sup> See Appendix, note 56. <sup>46</sup> See Appendix, note 57. <sup>47</sup> See Appendix, note 58. <sup>48</sup> See Appendix, note 59. <sup>49</sup> See Appendix, note 60. <sup>50</sup> See Appendix, note 61. <sup>51</sup> See Appendix, note 62. <sup>52</sup> See Appendix, note 63. <sup>53</sup> See Appendix, note 64. <sup>54</sup> See Appendix, note 65. <sup>55</sup> See Appendix, note 66. <sup>56</sup> See Appendix, note 67. <sup>57</sup> See Appendix, note 68. <sup>58</sup> See Appendix, note 69. <sup>59</sup> See Appendix, note 70. <sup>60</sup> See Appendix, note 71. <sup>61</sup> See Appendix, note 72. <sup>62</sup> See Appendix, note 73. <sup>63</sup> See Appendix, note 74. <sup>64</sup> See Appendix, note 75. <sup>65</sup> See Appendix, note 76. <sup>66</sup> See Appendix, note 77. <sup>67</sup> See Appendix, note 78. <sup>68</sup> See Appendix, note 79. <sup>69</sup> See Appendix, note 80. <sup>70</sup> See Appendix, note 81. <sup>71</sup> See Appendix, note 82. <sup>72</sup> See Appendix, note 83. <sup>73</sup> See Appendix, note 84. <sup>74</sup> See Appendix, note 85. <sup>75</sup> See Appendix, note 86. <sup>76</sup> See Appendix, note 87. <sup>77</sup> See Appendix, note 88. <sup>78</sup> See Appendix, note 89. <sup>79</sup> See Appendix, note 90. <sup>80</sup> See Appendix, note 91. <sup>81</sup> See Appendix, note 92. <sup>82</sup> See Appendix, note 93. <sup>83</sup> See Appendix, note 94. <sup>84</sup> See Appendix, note 95. <sup>85</sup> See Appendix, note 96. <sup>86</sup> See Appendix, note 97. <sup>87</sup> See Appendix, note 98. <sup>88</sup> See Appendix, note 99. <sup>89</sup> See Appendix, note 100. <sup>90</sup> See Appendix, note 101. <sup>91</sup> See Appendix, note 102. <sup>92</sup> See Appendix, note 103. <sup>93</sup> See Appendix, note 104. <sup>94</sup> See Appendix, note 105. <sup>95</sup> See Appendix, note 106. <sup>96</sup> See Appendix, note 107. <sup>97</sup> See Appendix, note 108. <sup>98</sup> See Appendix, note 109. <sup>99</sup> See Appendix, note 110. <sup>100</sup> See Appendix, note 111. <sup>101</sup> See Appendix, note 112. <sup>102</sup> See Appendix, note 113. <sup>103</sup> See Appendix, note 114. <sup>104</sup> See Appendix, note 115. <sup>105</sup> See Appendix, note 116. <sup>106</sup> See Appendix, note 117. <sup>107</sup> See Appendix, note 118. <sup>108</sup> See Appendix, note 119. <sup>109</sup> See Appendix, note 120. <sup>110</sup> See Appendix, note 121. <sup>111</sup> See Appendix, note 122. <sup>112</sup> See Appendix, note 123. <sup>113</sup> See Appendix, note 124. <sup>114</sup> See Appendix, note 125. <sup>115</sup> See Appendix, note 126. <sup>116</sup> See Appendix, note 127. <sup>117</sup> See Appendix, note 128. <sup>118</sup> See Appendix, note 129. <sup>119</sup> See Appendix, note 130. <sup>120</sup> See Appendix, note 131. <sup>121</sup> See Appendix, note 132. <sup>122</sup> See Appendix, note 133. <sup>123</sup> See Appendix, note 134. <sup>124</sup> See Appendix, note 135. <sup>125</sup> See Appendix, note 136. <sup>126</sup> See Appendix, note 137. <sup>127</sup> See Appendix, note 138. <sup>128</sup> See Appendix, note 139. <sup>129</sup> See Appendix, note 140. <sup>130</sup> See Appendix, note 141. <sup>131</sup> See Appendix, note 142. <sup>132</sup> See Appendix, note 143. <sup>133</sup> See Appendix, note 144. <sup>134</sup> See Appendix, note 145. <sup>135</sup> See Appendix, note 146. <sup>136</sup> See Appendix, note 147. <sup>137</sup> See Appendix, note 148. <sup>138</sup> See Appendix, note 149. <sup>139</sup> See Appendix, note 150. <sup>140</sup> See Appendix, note 151. <sup>141</sup> See Appendix, note 152. <sup>142</sup> See Appendix, note 153. <sup>143</sup> See Appendix, note 154. <sup>144</sup> See Appendix, note 155. <sup>145</sup> See Appendix, note 156. <sup>146</sup> See Appendix, note 157. <sup>147</sup> See Appendix, note 158. <sup>148</sup> See Appendix, note 159. <sup>149</sup> See Appendix, note 160. <sup>150</sup> See Appendix, note 161. <sup>151</sup> See Appendix, note 162. <sup>152</sup> See Appendix, note 163. <sup>153</sup> See Appendix, note 164. <sup>154</sup> See Appendix, note 165. <sup>155</sup> See Appendix, note 166. <sup>156</sup> See Appendix, note 167. <sup>157</sup> See Appendix, note 168. <sup>158</sup> See Appendix, note 169. <sup>159</sup> See Appendix, note 170. <sup>160</sup> See Appendix, note 171. <sup>161</sup> See Appendix, note 172. <sup>162</sup> See Appendix, note 173. <sup>163</sup> See Appendix, note 174. <sup>164</sup> See Appendix, note 175. <sup>165</sup> See Appendix, note 176. <sup>166</sup> See Appendix, note 177. <sup>167</sup> See Appendix, note 178. <sup>168</sup> See Appendix, note 179. <sup>169</sup> See Appendix, note 180. <sup>170</sup> See Appendix, note 181. <sup>171</sup> See Appendix, note 182. <sup>172</sup> See Appendix, note 183. <sup>173</sup> See Appendix, note 184. <sup>174</sup> See Appendix, note 185. <sup>175</sup> See Appendix, note 186. <sup>176</sup> See Appendix, note 187. <sup>177</sup> See Appendix, note 188. <sup>178</sup> See Appendix, note 189. <sup>179</sup> See Appendix, note 190. <sup>180</sup> See Appendix, note 191. <sup>181</sup> See Appendix, note 192. <sup>182</sup> See Appendix, note 193. <sup>183</sup> See Appendix, note 194. <sup>184</sup> See Appendix, note 195. <sup>185</sup> See Appendix, note 196. <sup>186</sup> See Appendix, note 197. <sup>187</sup> See Appendix, note 198. <sup>188</sup> See Appendix, note 199. <sup>189</sup> See Appendix, note 200. <sup>190</sup> See Appendix, note 201. <sup>191</sup> See Appendix, note 202. <sup>192</sup> See Appendix, note 203. <sup>193</sup> See Appendix, note 204. <sup>194</sup> See Appendix, note 205. <sup>195</sup> See Appendix, note 206. <sup>196</sup> See Appendix, note 207. <sup>197</sup> See Appendix, note 208. <sup>198</sup> See Appendix, note 209. <sup>199</sup> See Appendix, note 210. <sup>200</sup> See Appendix, note 211. <sup>201</sup> See Appendix, note 212. <sup>202</sup> See Appendix, note 213. <sup>203</sup> See Appendix, note 214. <sup>204</sup> See Appendix, note 215. <sup>205</sup> See Appendix, note 216. <sup>206</sup> See Appendix, note 217. <sup>207</sup> See Appendix, note 218. <sup>208</sup> See Appendix, note 219. <sup>209</sup> See Appendix, note 220. <sup>210</sup> See Appendix, note 221. <sup>211</sup> See Appendix, note 222. <sup>212</sup> See Appendix, note 223. <sup>213</sup> See Appendix, note 224. <sup>214</sup> See Appendix, note 225. <sup>215</sup> See Appendix, note 226. <sup>216</sup> See Appendix, note 227. <sup>217</sup> See Appendix, note 228. <sup>218</sup> See Appendix, note 229. <sup>219</sup> See Appendix, note 230. <sup>220</sup> See Appendix, note 231. <sup>221</sup> See Appendix, note 232. <sup>222</sup> See Appendix, note 233. <sup>223</sup> See Appendix, note 234. <sup>224</sup> See Appendix, note 235. <sup>225</sup> See Appendix, note 236. <sup>226</sup> See Appendix, note 237. <sup>227</sup> See Appendix, note 238. <sup>228</sup> See Appendix, note 239. <sup>229</sup> See Appendix, note 240. <sup>230</sup> See Appendix, note 241. <sup>231</sup> See Appendix, note 242. <sup>232</sup> See Appendix, note 243. <sup>233</sup> See Appendix, note 244. <sup>234</sup> See Appendix, note 245. <sup>235</sup> See Appendix, note 246. <sup>236</sup> See Appendix, note 247. <sup>237</sup> See Appendix, note 248. <sup>238</sup> See Appendix, note 249. <sup>239</sup> See Appendix, note 250. <sup>240</sup> See Appendix, note 251. <sup>241</sup> See Appendix, note 252. <sup>242</sup> See Appendix, note 253. <sup>243</sup> See Appendix, note 254. <sup>244</sup> See Appendix, note 255. <sup>245</sup> See Appendix, note 256. <sup>246</sup> See Appendix, note 257. <sup>247</sup> See Appendix, note 258. <sup>248</sup> See Appendix, note 259. <sup>249</sup> See Appendix, note 260. <sup>250</sup> See Appendix, note 261. <sup>251</sup> See Appendix, note 262. <sup>252</sup> See Appendix, note 263. <sup>253</sup> See Appendix, note 264. <sup>254</sup> See Appendix, note 265. <sup>255</sup> See Appendix, note 266. <sup>256</sup> See Appendix, note 267. <sup>257</sup> See Appendix, note 268. <sup>258</sup> See Appendix, note 269. <sup>259</sup> See Appendix, note 270. <sup>260</sup> See Appendix, note 271. <sup>261</sup> See Appendix, note 272. <sup>262</sup> See Appendix, note 273. <sup>263</sup> See Appendix, note 274. <sup>264</sup> See Appendix, note 275. <sup>265</sup> See Appendix, note 276. <sup>266</sup> See Appendix, note 277. <sup>267</sup> See Appendix, note 278. <sup>268</sup> See Appendix, note 279. <sup>269</sup> See Appendix, note 280. <sup>270</sup> See Appendix, note 281. <sup>271</sup> See Appendix, note 282. <sup>272</sup> See Appendix, note 283. <sup>273</sup> See Appendix, note 284. <sup>274</sup> See Appendix, note 285. <sup>275</sup> See Appendix, note 286. <sup>276</sup> See Appendix, note 287. <sup>277</sup> See Appendix, note 288. <sup>278</sup> See Appendix, note 289. <sup>279</sup> See Appendix, note 290. <sup>280</sup> See Appendix, note 291. <sup>281</sup> See Appendix, note 292. <sup>282</sup> See Appendix, note 293. <sup>283</sup> See Appendix, note 294. <sup>284</sup> See Appendix, note 295. <sup>285</sup> See Appendix, note 296. <sup>286</sup> See Appendix, note 297. <sup>287</sup> See Appendix, note 298. <sup>288</sup> See Appendix, note 299. <sup>289</sup> See Appendix, note 300. <sup>290</sup> See Appendix, note 301. <sup>291</sup> See Appendix, note 302. <sup>292</sup> See Appendix, note 303. <sup>293</sup> See Appendix, note 304. <sup>294</sup> See Appendix, note 305. <sup>295</sup> See Appendix, note 306. <sup>296</sup> See Appendix, note 307. <sup>297</sup> See Appendix, note 308. <sup>298</sup> See Appendix, note 309. <sup>299</sup> See Appendix, note 310. <sup>300</sup> See Appendix, note 311. <sup>301</sup> See Appendix, note 312. <sup>302</sup> See Appendix, note 313. <sup>303</sup> See Appendix, note 314. <sup>304</sup> See Appendix, note 315. <sup>305</sup> See Appendix, note 316. <sup>306</sup> See Appendix, note 317. <sup>307</sup> See Appendix, note 318. <sup>308</sup> See Appendix, note 319. <sup>309</sup> See Appendix, note 320. <sup>310</sup> See Appendix, note 321. <sup>311</sup> See Appendix, note 322. <sup>312</sup> See Appendix, note 323. <sup>313</sup> See Appendix, note 324. <sup>314</sup> See Appendix, note 325. <sup>315</sup> See Appendix, note 326. <sup>316</sup> See Appendix, note 327. <sup>317</sup> See Appendix, note 328. <sup>318</sup> See Appendix, note 329. <sup>319</sup> See Appendix, note 330. <sup>320</sup> See Appendix, note 331. <sup>321</sup> See Appendix, note 332. <sup>322</sup> See Appendix, note 333. <sup>323</sup> See Appendix, note 334. <sup>324</sup> See Appendix, note 335. <sup>325</sup> See Appendix, note 336. <sup>326</sup> See Appendix, note 337. <sup>327</sup> See Appendix, note 338. <sup>328</sup> See Appendix, note 339. <sup>329</sup> See Appendix, note 340. <sup>330</sup> See Appendix, note 341. <sup>331</sup> See Appendix, note 342. <sup>332</sup> See Appendix, note 343. <sup>333</sup> See Appendix, note 344. <sup>334</sup> See Appendix, note 345. <sup>335</sup> See Appendix, note 346. <sup>336</sup> See Appendix, note 347. <sup>337</sup> See Appendix, note 348. <sup>338</sup> See Appendix, note 349. <sup>339</sup> See Appendix, note 350. <sup>340</sup> See Appendix, note 351. <sup>341</sup> See Appendix, note 352. <sup>342</sup> See Appendix, note 353. <sup>343</sup> See Appendix, note 354. <sup>344</sup> See Appendix, note 355. <sup>345</sup> See Appendix, note 356. <sup>346</sup> See Appendix, note 357. <sup>347</sup> See Appendix, note 358. <sup>348</sup> See Appendix, note 359. <sup>349</sup> See Appendix, note 360. <sup>350</sup> See Appendix, note 361. <sup>351</sup> See Appendix, note 362. <sup>352</sup> See Appendix, note 363. <sup>353</sup> See Appendix, note 364. <sup>354</sup> See Appendix, note 365. <sup>355</sup> See Appendix, note 366. <sup>356</sup> See Appendix, note 367. <sup>357</sup> See Appendix, note 368. <sup>358</sup> See Appendix, note 369. <sup>359</sup> See Appendix, note 370. <sup>360</sup> See Appendix, note 371. <sup>361</sup> See Appendix, note 372. <sup>362</sup> See Appendix, note 373. <sup>363</sup> See Appendix, note 374. <sup>364</sup> See Appendix, note 375. <sup>365</sup> See Appendix, note 376. <sup>366</sup> See Appendix, note 377. <sup>367</sup> See Appendix, note 378. <sup>368</sup> See Appendix, note 379. <sup>369</sup> See Appendix, note 380. <sup>370</sup> See Appendix, note 381. <sup>371</sup> See Appendix, note 382. <sup>372</sup> See Appendix, note 383. <sup>373</sup> See Appendix, note 384. <sup>374</sup> See Appendix, note 385. <sup>375</sup> See Appendix, note 386. <sup>376</sup> See Appendix, note 387. <sup>377</sup> See Appendix, note 388. <sup>378</sup> See Appendix, note 389. <sup>379</sup> See Appendix, note 390. <sup>380</sup> See Appendix, note 391. <sup>381</sup> See Appendix, note 392. <sup>382</sup> See Appendix, note 393. <sup>383</sup> See Appendix, note 394. <sup>384</sup> See Appendix, note 395. <sup>385</sup> See Appendix, note 396. <sup>386</sup> See Appendix, note 397. <sup>387</sup> See Appendix, note 398. <sup>388</sup> See Appendix, note 399. <sup>389</sup> See Appendix, note 400. <sup>390</sup> See Appendix, note 401. <sup>391</sup> See Appendix, note 402. <sup>392</sup> See Appendix, note 403. <sup>393</sup> See Appendix, note 404. <sup>394</sup> See Appendix, note 405. <sup>395</sup> See Appendix, note 406. <sup>396</sup> See Appendix, note 407. <sup>397</sup> See Appendix, note 408. <sup>398</sup> See Appendix, note 409. <sup>399</sup> See Appendix, note 410. <sup>400</sup> See Appendix, note 411. <sup>401</sup> See Appendix, note 412. <sup>402</sup> See Appendix, note 413. <sup>403</sup> See Appendix, note 414. <sup>404</sup> See Appendix, note 415. <sup>405</sup> See Appendix, note 416. <sup>406</sup> See Appendix, note 417. <sup>407</sup> See Appendix, note 418. <sup>408</sup> See Appendix, note 419. <sup>409</sup> See Appendix, note 420. <sup>410</sup> See Appendix, note 421. <sup>411</sup> See Appendix, note 422. <sup>412</sup> See Appendix, note 423. <sup>413</sup> See Appendix, note 424. <sup>414</sup> See Appendix, note 425. <sup>415</sup> See Appendix, note 426. <sup>416</sup> See Appendix, note 427. <sup>417</sup> See Appendix, note 428. <sup>418</sup> See Appendix, note 429. <sup>419</sup> See Appendix, note 430. <sup>420</sup> See Appendix, note 431. <sup>421</sup> See Appendix, note 432. <sup>422</sup> See Appendix, note 433. <sup>423</sup> See Appendix, note 434. <sup>424</sup> See Appendix, note 435. <sup>425</sup> See Appendix, note 436. <sup>426</sup> See Appendix, note 437. <sup>427</sup> See Appendix, note 438. <sup>428</sup> See Appendix, note 439. <sup>429</sup> See Appendix, note 440. <sup>430</sup> See Appendix, note 441. <sup>431</sup> See Appendix, note 442. <sup>432</sup> See Appendix, note 443. <sup>433</sup> See Appendix, note 444. <sup>434</sup> See Appendix, note 445. <sup>435</sup> See Appendix, note 446. <sup>436</sup> See Appendix, note 447. <sup>437</sup> See Appendix, note 448. <sup>438</sup> See Appendix, note 449. <sup>439</sup> See Appendix, note 450. <sup>440</sup> See Appendix, note 451. <sup>441</sup> See Appendix, note 452. <sup>442</sup> See Appendix, note 453. <sup>443</sup> See Appendix, note 454. <sup>444</sup> See Appendix, note 455. <sup>445</sup> See Appendix, note 456. <sup>446</sup> See Appendix, note 457. <sup>447</sup> See Appendix, note 458. <sup>448</sup> See Appendix, note 459. <sup>449</sup> See Appendix, note 460. <sup>450</sup> See Appendix, note 461. <sup>451</sup> See Appendix, note 462. <sup>452</sup> See Appendix, note 463. <sup>453</sup> See Appendix, note 464. <sup>454</sup> See Appendix, note 465. <sup>455</sup> See Appendix, note 466. <sup>456</sup> See Appendix, note 467. <sup>457</sup> See Appendix, note 468. <sup>458</sup> See Appendix, note 469. <sup>459</sup> See Appendix, note 470. <sup>460</sup> See Appendix, note 471. <sup>461</sup> See Appendix, note 472. <sup>462</sup> See Appendix, note 473. <sup>463</sup> See Appendix, note 474. <sup>464</sup> See Appendix, note 475. <sup>465</sup> See Appendix, note 476. <sup>466</sup> See Appendix, note 477. <sup>467</sup> See Appendix, note 478. <sup>468</sup> See Appendix, note 479. <sup>469</sup> See Appendix, note 480. <sup>470</sup> See Appendix, note 481. <sup>471</sup> See Appendix, note 482. <sup>472</sup> See Appendix, note 483. <sup>473</sup> See Appendix, note 484. <sup>474</sup> See Appendix, note 485. <sup>475</sup> See Appendix, note 486. <sup>476</sup> See Appendix, note 487. <sup>477</sup> See Appendix, note 488. <sup>478</sup> See Appendix, note 489. <sup>479</sup> See Appendix, note 490. <sup>480</sup> See Appendix, note 491. <sup>481</sup> See Appendix, note 492. <sup>482</sup> See Appendix, note 493. <sup>483</sup> See Appendix, note 494. <sup>484</sup> See Appendix, note 495. <sup>485</sup> See Appendix, note 496. <sup>486</sup> See Appendix, note 497. <sup>487</sup> See Appendix, note 498. <sup>488</sup> See Appendix, note 499. <sup>489</sup> See Appendix, note 500. <sup>490</sup> See Appendix, note 501. <sup>491</sup> See Appendix, note 502. <sup>492</sup> See Appendix, note 503. <sup>493</sup> See Appendix, note 504. <sup>494</sup> See Appendix, note 505. <sup>495</sup> See Appendix, note 506. <sup>496</sup> See Appendix, note 507. <sup>497</sup> See Appendix, note 508. <sup>498</sup> See Appendix, note 509. <sup>499</sup> See Appendix, note 510. <sup>500</sup> See Appendix, note 511. <sup>501</sup> See Appendix, note 512. <sup>502</sup> See Appendix, note 513. <sup>503</sup> See Appendix, note 514. <sup>504</sup> See Appendix, note 515. <sup>505</sup> See Appendix, note 516. <sup>506</sup> See Appendix, note 517. <sup>507</sup> See Appendix, note 518. <sup>508</sup> See Appendix, note 519. <sup>509</sup> See Appendix, note 520. <sup>510</sup> See Appendix, note 521. <sup>511</sup> See Appendix, note 522. <sup>512</sup> See Appendix, note 523. <sup>513</sup> See Appendix, note 524. <sup>514</sup> See Appendix, note 525. <sup>515</sup> See Appendix, note 526. <sup>516</sup> See Appendix, note 527. <sup>517</sup> See Appendix, note 528. <sup>518</sup> See Appendix, note 529. <sup>519</sup> See Appendix, note 530. <sup>520</sup> See Appendix, note 531. <sup>521</sup> See Appendix, note 532. <sup>522</sup> See Appendix, note 533. <sup>523</sup> See Appendix, note 534. <sup>524</sup> See Appendix, note 535. <sup>525</sup> See Appendix, note 536. <sup>526</sup> See Appendix, note 537. <sup>527</sup> See Appendix, note 538. <sup>528</sup> See Appendix, note 539. <sup>529</sup> See Appendix, note 540. <sup>530</sup> See Appendix, note 541. <sup>531</sup> See Appendix, note 542. <sup>532</sup> See Appendix, note 543. <sup>533</sup> See Appendix, note 544. <sup>534</sup> See Appendix, note 545. <sup>535</sup> See Appendix, note 546. <sup>536</sup> See Appendix, note 547. <sup>537</sup> See Appendix, note 548. <sup>538</sup> See Appendix, note 549. <sup>539</sup> See Appendix, note 550. <sup>540</sup> See Appendix, note 551. <sup>541</sup> See Appendix, note 552. <sup>542</sup> See Appendix, note 553. <sup>543</sup> See Appendix, note 554. <sup>544</sup> See Appendix, note 555. <sup>545</sup> See Appendix, note 556. <sup>546</sup> See Appendix, note 557. <sup>547</sup> See Appendix, note 558. <sup>548</sup> See Appendix, note 559. <sup>549</sup> See Appendix, note 560. <sup>550</sup> See Appendix, note 561. <sup>551</sup> See Appendix, note 562. <sup>552</sup> See Appendix, note 563. <sup>553</sup> See Appendix, note 564. <sup>554</sup> See Appendix, note 565. <sup>555</sup> See Appendix, note 566. <sup>556</sup> See Appendix, note 567. <sup>557</sup> See Appendix, note 568. <sup>558</sup> See Appendix, note 569. <sup>559</sup> See Appendix, note 570. <sup>560</sup> See Appendix, note 571. <sup>561</sup> See Appendix, note 572. <sup>562</sup> See Appendix, note 573. <sup>563</sup> See Appendix, note 574. <sup>564</sup> See Appendix, note 575. <sup>565</sup> See Appendix, note 576. <sup>566</sup> See Appendix, note 577. <sup>567</sup> See Appendix, note 578. <sup>568</sup> See Appendix, note 579. <sup>569</sup> See Appendix, note 580. <sup>570</sup> See Appendix, note 581. <sup>571</sup> See Appendix, note 582. <sup>572</sup> See Appendix, note 583. <sup>573</sup> See Appendix, note 584. <sup>574</sup> See Appendix, note 585. <sup>575</sup> See Appendix, note 586. <sup>576</sup> See Appendix, note 587. <sup>577</sup> See Appendix, note 588. <sup>578</sup> See Appendix, note 589. <sup>579</sup> See Appendix, note 590. <sup>580</sup> See Appendix, note 591. <sup>581</sup> See Appendix, note 592. <sup>582</sup> See Appendix, note 593. <sup>583</sup> See Appendix, note 594. <sup>584</sup> See Appendix, note 595. <sup>585</sup> See Appendix, note 596. <sup>586</sup> See Appendix, note 597. <sup>587</sup> See Appendix, note 598. <sup>588</sup> See Appendix, note 599. <sup>589</sup> See Appendix, note 600. <sup>590</sup> See Appendix, note 601. <sup>591</sup> See Appendix, note 602. <sup>592</sup> See Appendix, note 603. <sup>593</sup> See Appendix, note 604. <sup>594</sup> See Appendix, note 605. <sup>595</sup> See Appendix, note 606. <sup>596</sup> See Appendix, note 607. <sup>597</sup> See Appendix, note 608. <sup>598</sup> See Appendix, note 609. <sup>599</sup> See Appendix, note 610. <sup>600</sup> See Appendix

Trigeminal or trifacial nerve  
Superior petrosal sinus

Internal petrosal sinus  
Embranching vein on the anterior  
condylar process of the  
Internal carotid artery

Termination of the inferior  
petrosal sinus in the internal  
jugular vein  
Occipital artery and companion  
veins A. Internal jugular vein

Ascending pharyngeal artery

Digastric muscle (posterior belly)

Parotid gland  
External carotid artery  
A. Temporo-massillary vein  
Lingual artery and vein  
A.

Sternomastoid artery and vein

Superior thyroid artery and vein

Internal jugular vein  
Pharyngeal venous plexus

External jugular vein

Omohyoid muscle A.  
Inferior thyroid vein

Left innominate (or brachiocephalic)  
vein

Suprascapular vein<sup>1</sup>

Left subclavian vein

Left common carotid artery  
Left subclavian artery

Accessory hemiazygos vein

Thoracic duct

Internal thoracic artery and vein

Left pulmonary artery

Descending thoracic aorta

Lingual artery  
External carotid artery

Superior thyroid

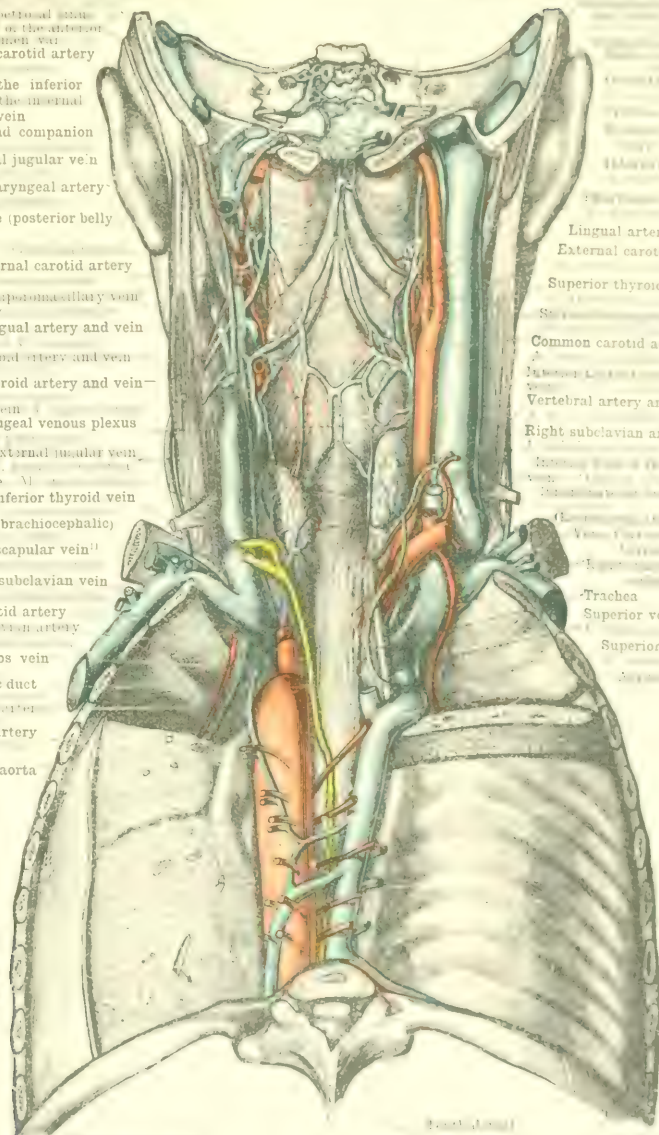
Common carotid artery

Vertebral artery and vein

Right subclavian artery

Trachea  
Superior vena

Superior intercostal vein





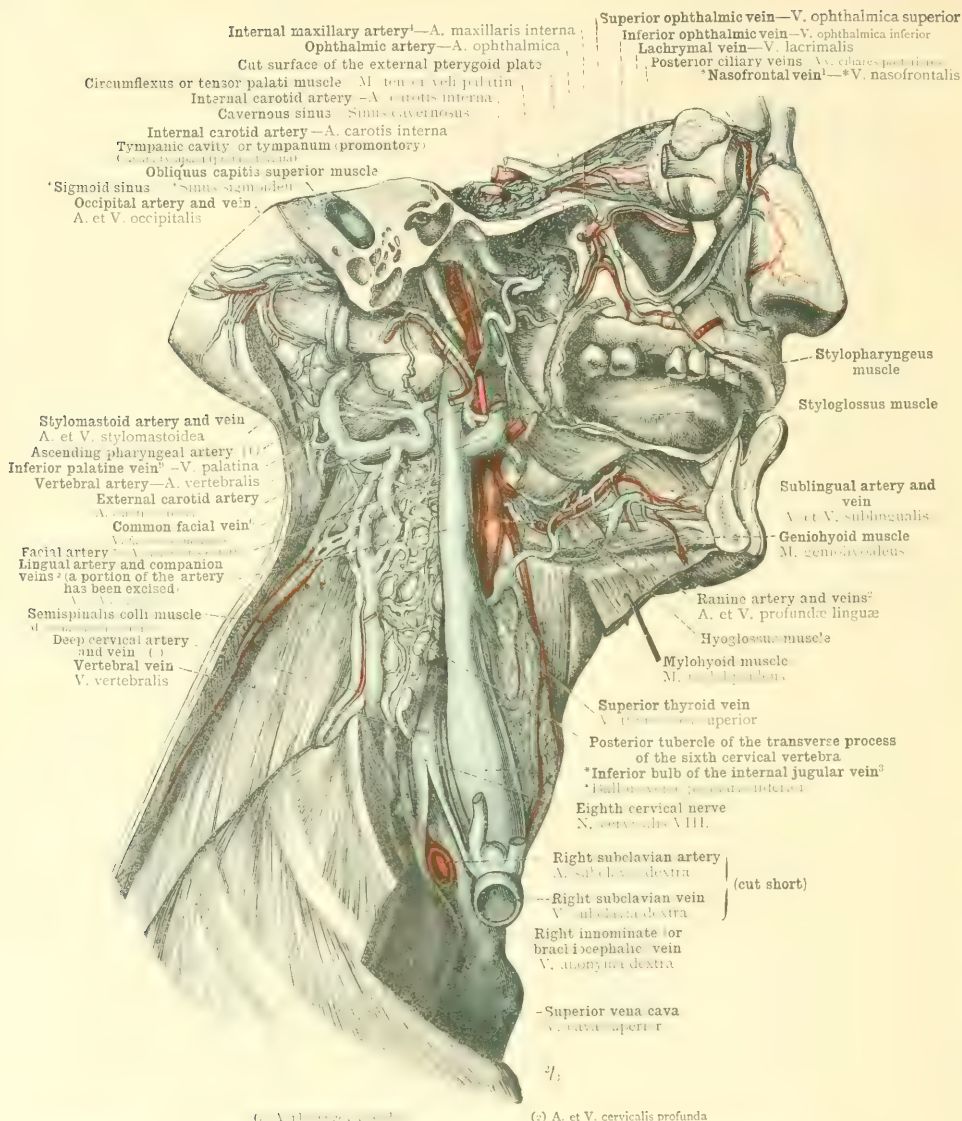
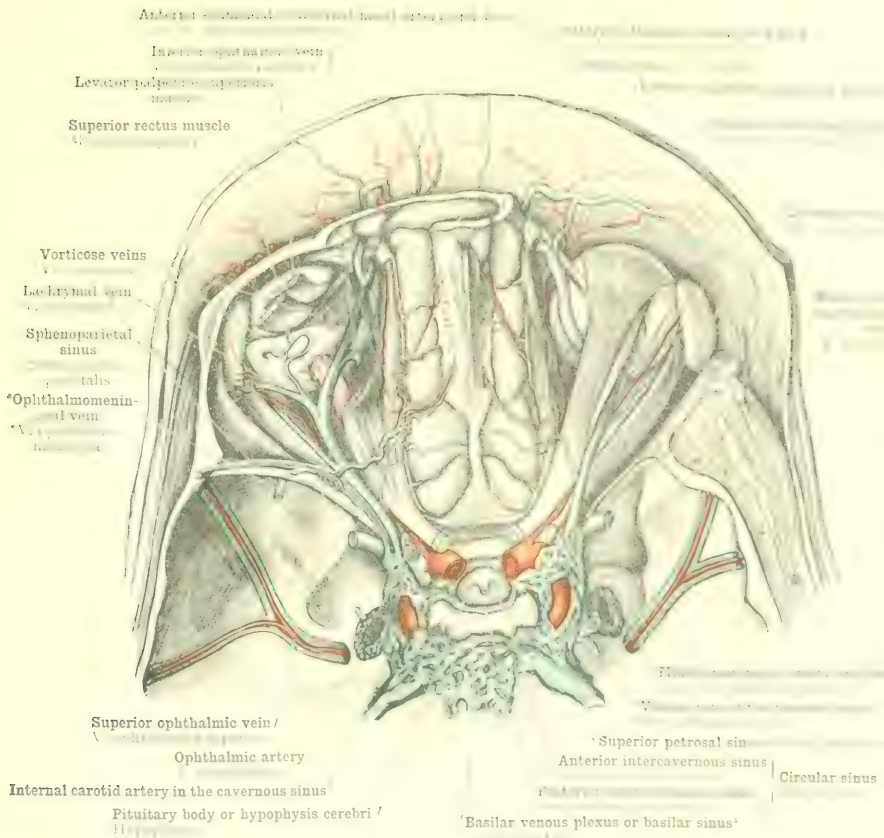
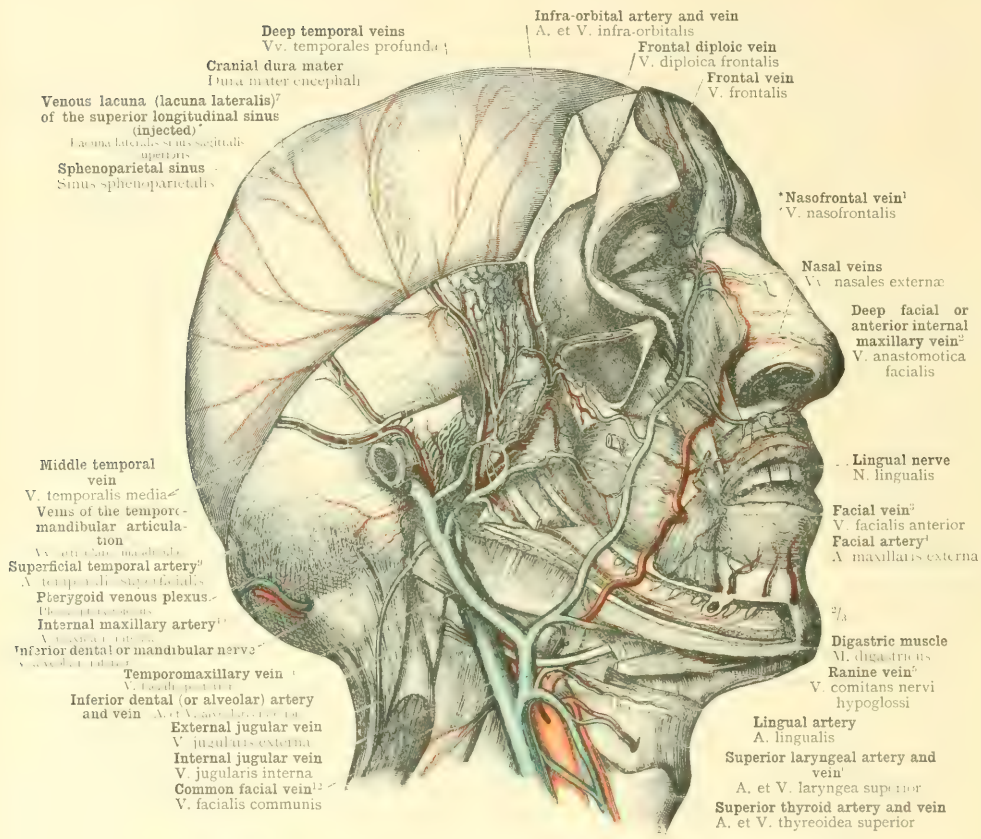


FIG. 1081.—THE CAVERNOUS SINUS AND THE VEINS OF THE ORBIT; THE DEEP VISCERAL VEINS OF THE HEAD AND NECK; THE DEEP CERVICAL OR POSTERIOR VERTEBRAL VEIN, VENA CERVICALIS PROFUNDA, AND THE VERTEBRAL VEIN, VENA VERTEBRALIS. SEEN FROM THE RIGHT SIDE.





The Veins of the Orbit. The Cavernous and Circular Sinuses.



<sup>1</sup> See Appendix, note 1. <sup>2</sup> This vein is a communicating branch from the posterior maxillary vein. <sup>3</sup> See Appendix, note 1. <sup>4</sup> Sometimes distinguished by the name of V. facialis posterior. <sup>5</sup> See Appendix, note 1. <sup>6</sup> See Appendix, note 1. <sup>7</sup> Sometimes called the pterygoid vein. <sup>8</sup> See Appendix, note 1. <sup>9</sup> See Appendix, note 1. <sup>10</sup> See Appendix, note 1. <sup>11</sup> See Appendix, note 1. <sup>12</sup> See Appendix, note 1.

FIG. 1083.—THE FORMATION OF THE COMMON FACIAL VEIN, VENA FACIALIS COMMUNIS, BY THE CONFLUENCE OF THE FACIAL (OR ANTERIOR FACIAL) VEIN, VENA FACIALIS ANTERIOR, AND THE TEMPOROMAXILLARY (OR POSTERIOR FACIAL) VEIN, VENA FACIALIS POSTERIOR. (See Appendix, note 1.) THE PTERYGOID VENOUS PLEXUS, PLEXUS PTERYGOIDEUS, THE VEINS OF THE LOWER JAW, AND THE VEINS OF THE DURA MATER—THE MIDDLE MENINGEAL VEIN, VENA MENINGEA MEDIA, SEEN FROM THE RIGHT SIDE.

By the partial removal of the skull cap (calvaria), the cranial dura mater was exposed. By the removal of the zygomatic arch, of the upper half of the ramus of the mandible (with the exception of the head of the condyle), and of the temporal and masseter muscles, the pterygoid venous plexus, plexus pterygoideus, was exposed. By the opening of the mandibular or inferior dental canal, canalis mandibulae, the inferior dental (or alveolar) artery and its plexiform companion veins were exposed.

The Pterygoid Venous Plexus, Plexus Pterygoideus. The Veins of the Dura Mater and of the Lower Jaw.

Superior cerebral veins

External jugular vein

Mandible

Venous lacuna (lacuna lateralis)  
of the superior vena cava

Lateral sinus

Internal jugular vein

Sternocleidomastoid muscle

External carotid artery

Inferior palatine vein

Temporomaxillary vein

Internal carotid artery

Hypoglossal nerve

Internal jugular vein

Superior thyroid



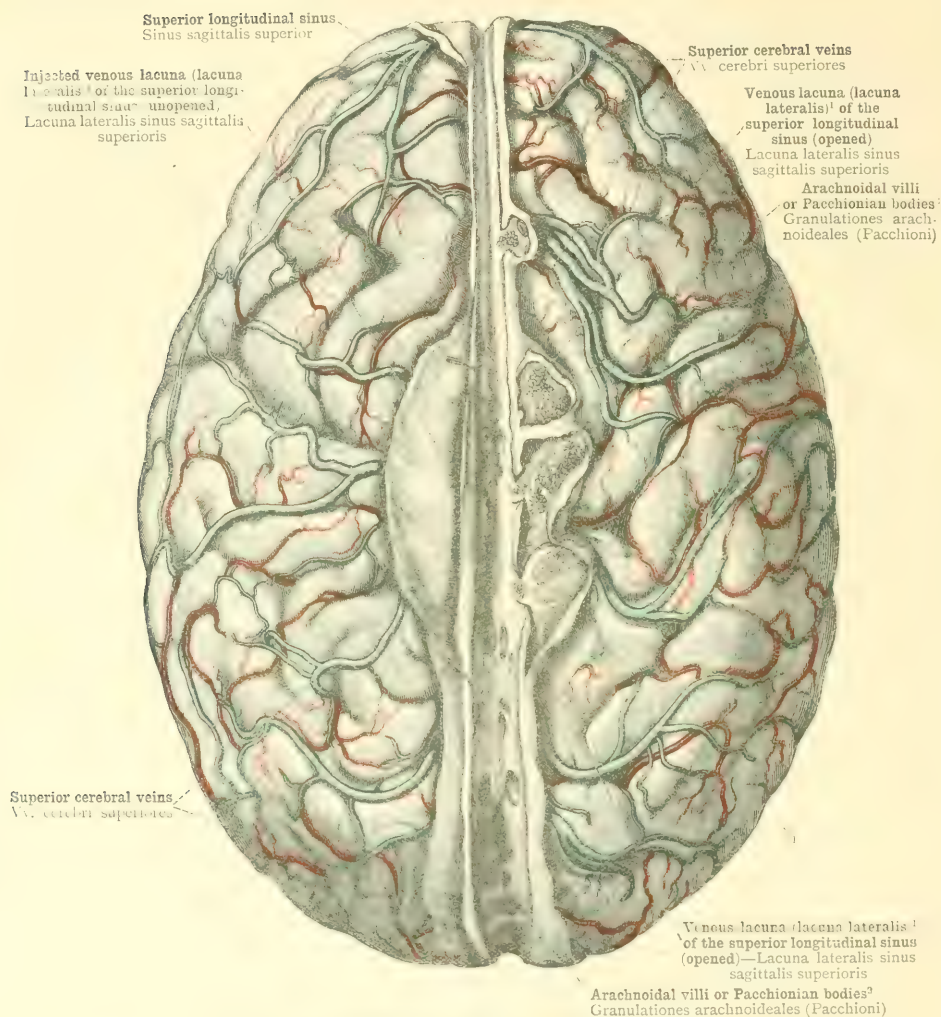
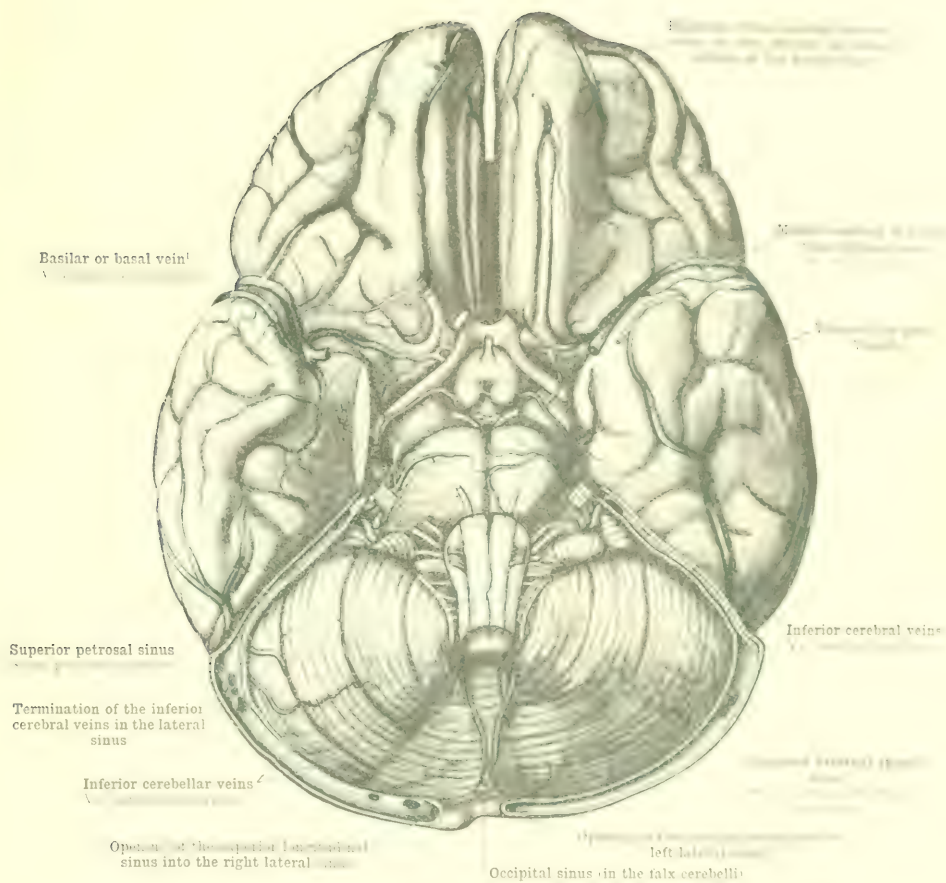


FIG. 1085.—THE SUPERIOR CEREBRAL VEINS, VENE CEREBRI SUPERIORES. THE SUPERIOR LONGITUDINAL SINUS, SINUS SAGITTALIS SUPERIOR; ITS VENOUS LACUNÆ (LACUNÆ LATERALES—see *Appendix*, note <sup>23</sup>), AND THE RELATIONS OF THE LATTER TO THE SUPERIOR CEREBRAL VEINS AND TO THE ARACHNOIDAL VILLI OR PACCHIONIAN BODIES (GRANULATIONES ARACHNOIDEALES—FACCIONI—see *Appendix*, note <sup>24</sup>). SEEN FROM ABOVE.

The cranial dura mater was removed, except in the immediate vicinity of the superior longitudinal sinus (sinus sagittalis superior). On the left side the venous lacunæ (lacunæ laterales) were unopened; on the right side these lacunæ were opened from above, and the arachnoidal villi or Pacchionian bodies proliferating in their interior were thus displayed.







VENÆ EXTREMITATUM  
SUPERIORUM ET INFERIORUM  
THE VEINS OF THE UPPER AND  
LOWER LIMBS

Superficial layer of the aponeurosis of the arm (or deep brachial fascia) divided along the deltoideopectoral groove, the cut edges being turned inwards and outwards

Aponeurosis of the arm, or deep brachial fascia  
Fascia brachii

\*Accessory median vein (of the elbow  
(var.)  
\*V. mediana cubiti accessoria (var.)

Median basilic vein  
V. mediana basilica

Median cephalic vein  
V. mediana cephalica

Deep median vein<sup>1</sup>  
Ramus anastomoticus

Deep fascia of the forearm  
Fascia antibrachii

Subcutaneous venous network of the anterior surface of the upper arm

Basilic vein  
V. basilica

Anterior and posterior ulnar veins<sup>2</sup>  
V. basilica

Median vein (of the forearm)  
V. mediana antibrachii

<sup>1</sup> See Appendix, note 1.  
<sup>2</sup> Cf. also Mandelstam, *op. cit.*, p. 100. See Appendix, note 2.

FIG. 1087.—THE SUBCUTANEOUS VEINS OF THE FRONT OF THE SHOULDER, THE FRONT OF THE ARM, AND THE FLEXURE OF THE ELBOW.



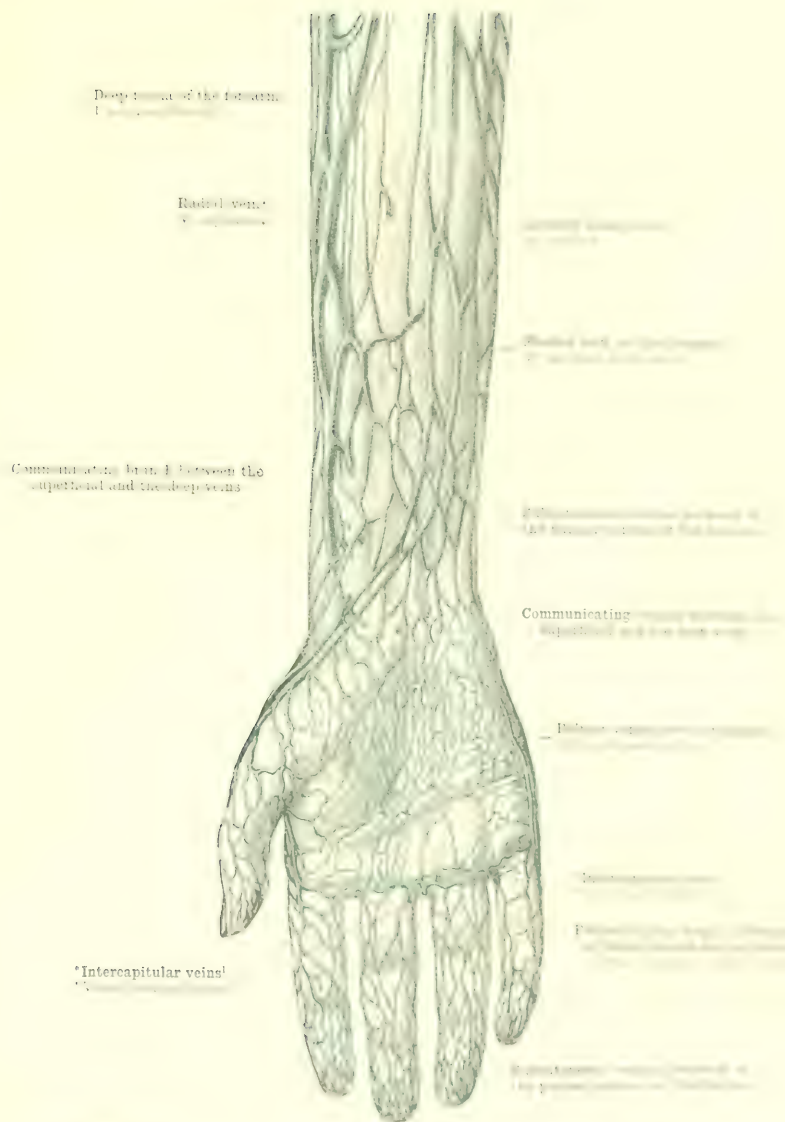


FIG. 105. THE VEINS OF THE HUMAN BODY. (Continued from page 104.)

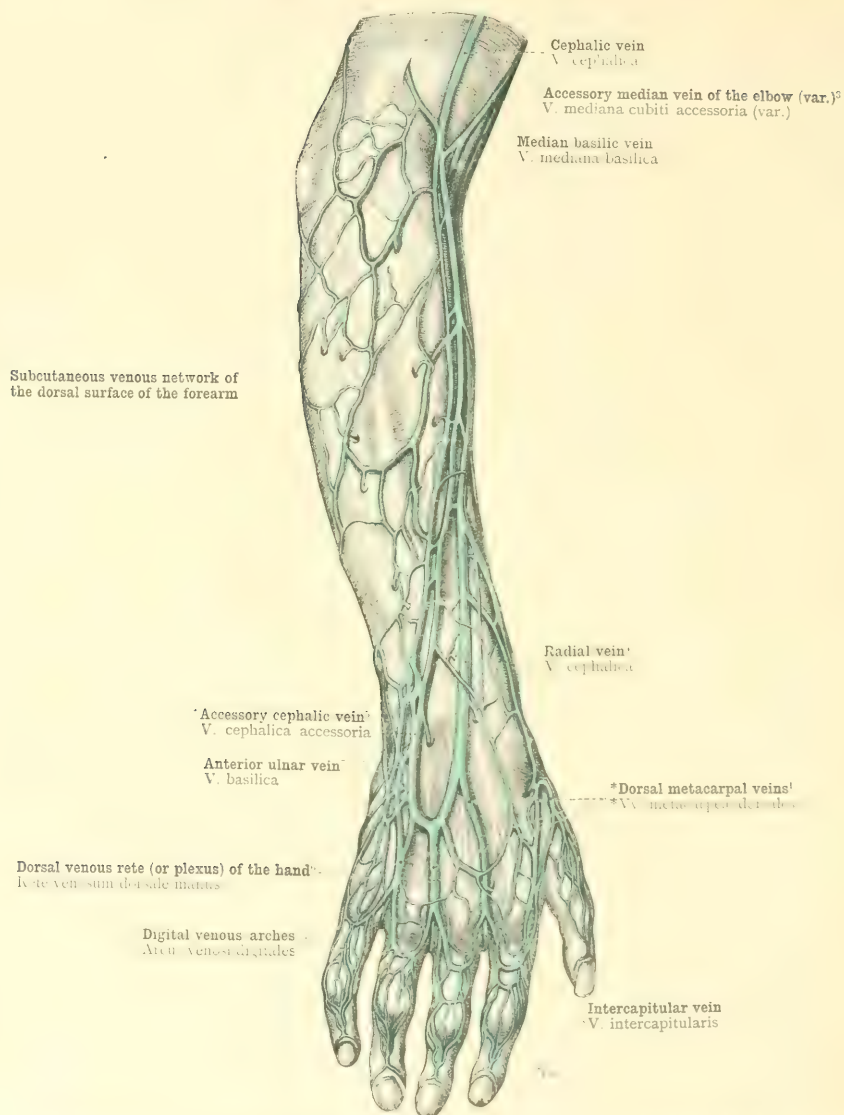


FIG. 1089.—THE SUBCUTANEOUS VEINS OF THE DORSAL SURFACE OF THE FOREARM AND HAND.

Cutaneous Veins of the Arm.

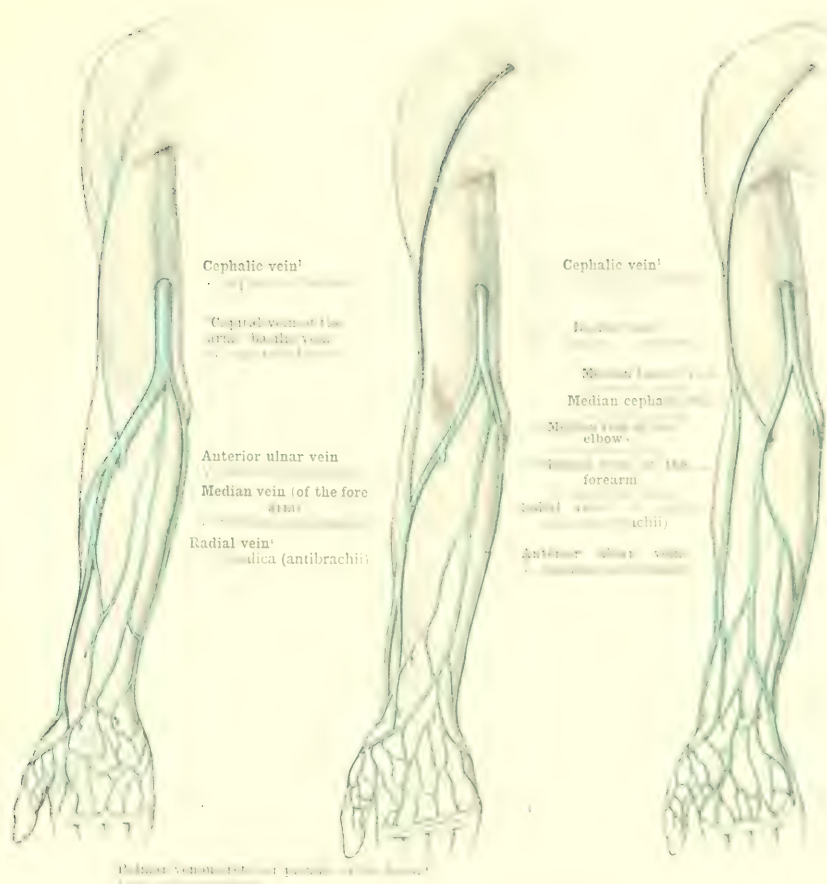
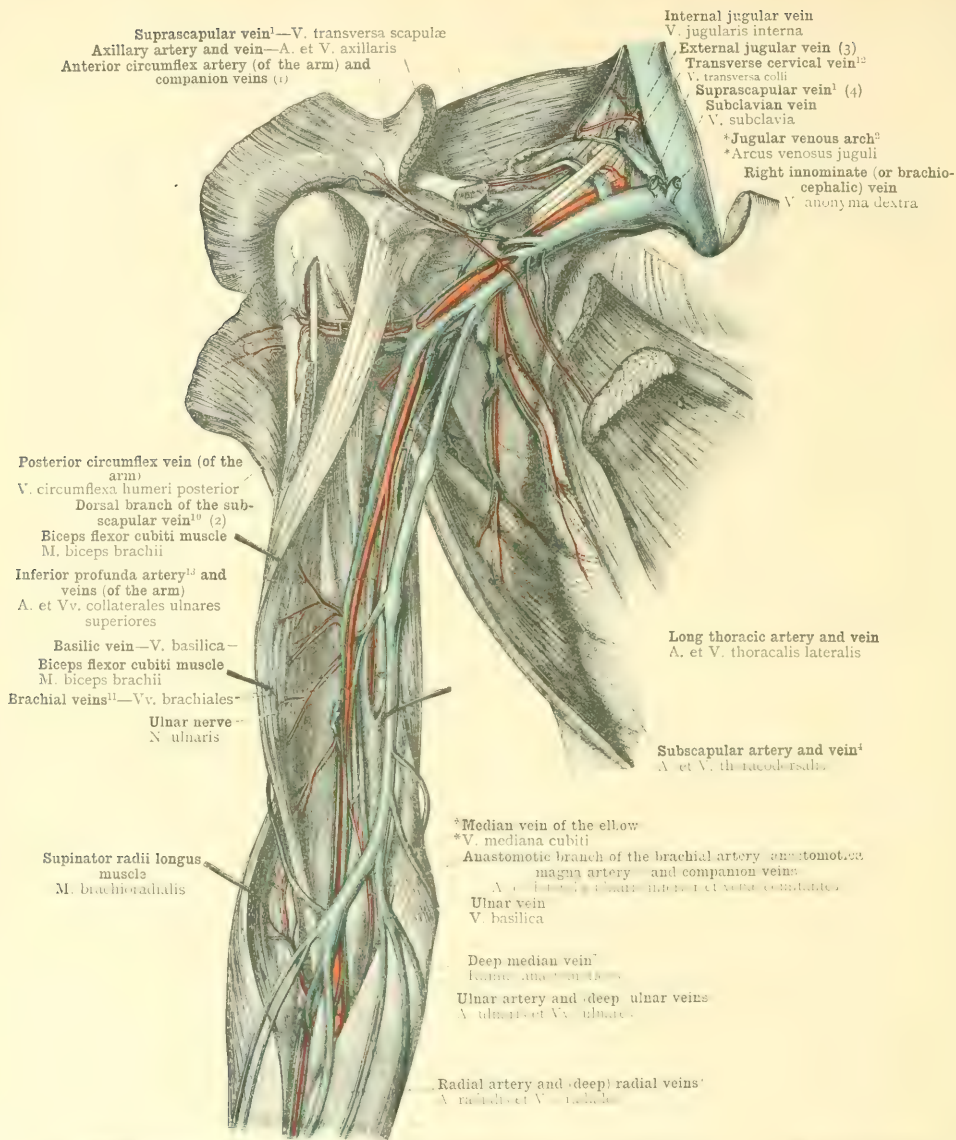


FIG. 100. THE CUTANEOUS VEIN SYSTEM OF THE UPPER LIMB. (A) Superficial veins of the forearm and hand. (B) Deep veins of the forearm and hand. (C) Connections of the superficial and deep veins of the forearm and hand.



(1) A. circumflexa humeri anterior et V. circumflexa humeri anterior

(2) V. circumflexa humeri posterior

(3) V. circumflexa humeri posterior

(4) V. circumflexa humeri posterior

(5) V. circumflexa humeri posterior

(6) V. circumflexa humeri posterior

(7) V. circumflexa humeri posterior

(8) V. circumflexa humeri posterior

(9) V. circumflexa humeri posterior

(10) V. circumflexa humeri posterior

(11) V. circumflexa humeri posterior

(12) V. circumflexa humeri posterior

(13) V. circumflexa humeri posterior

FIG. 100. THE DEEP VEINS AND ARTERIES OF THE UPPER LIMB. SUPRASCAPULAR FOSSA. *See Appendix, p. 700.*  
 FOSSA SUPRACLAVICULARIS. MARK OF THE ANTERIOR ANGLE OF THE FRONT OF THE UPPER ARM: THE CONNECTION BETWEEN THE SUPERFICIAL AND THE DEEP VEINS OF THE FLEXURE OF THE ELBOW.

### Deep Veins of the Axilla and the Upper Arm.



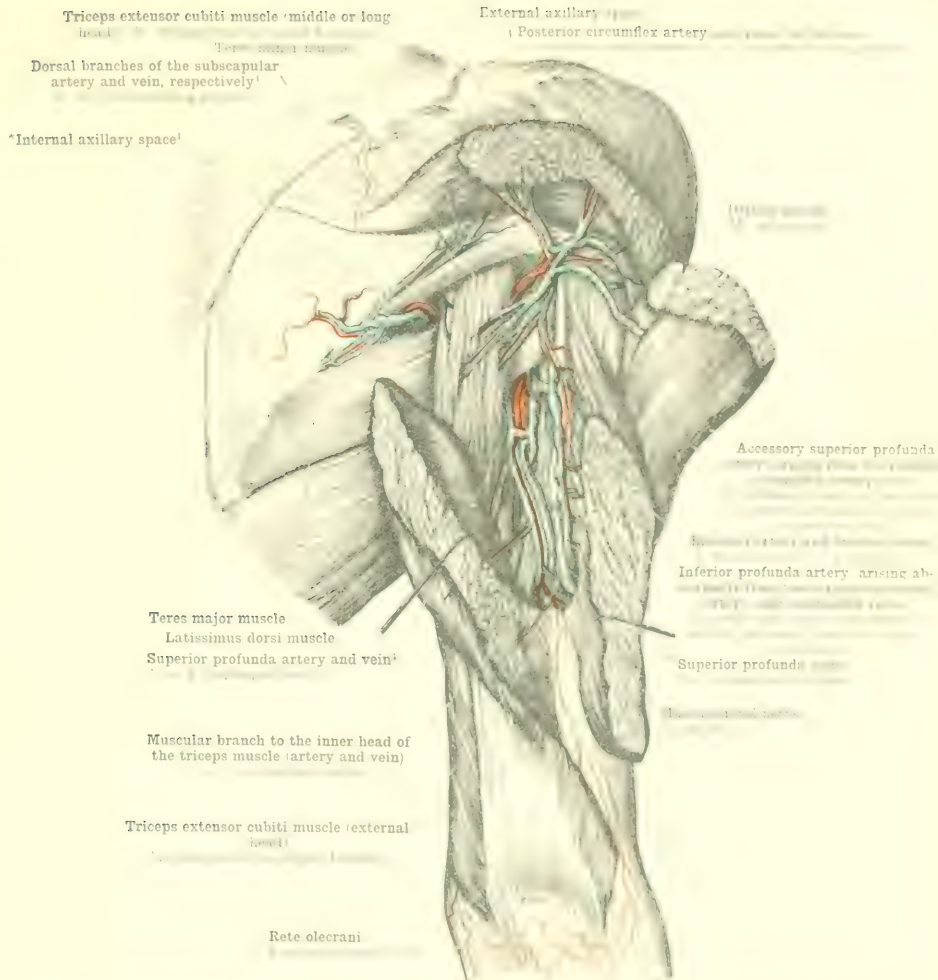


Fig. 1.

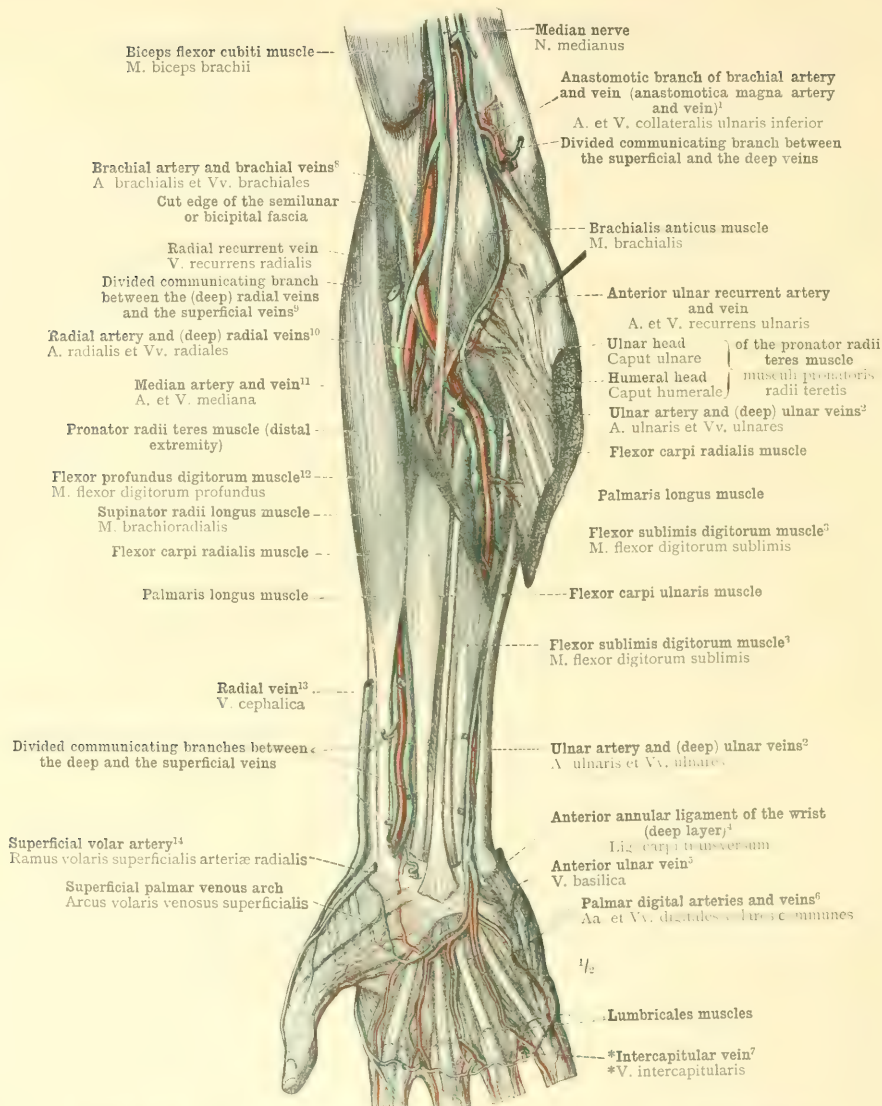
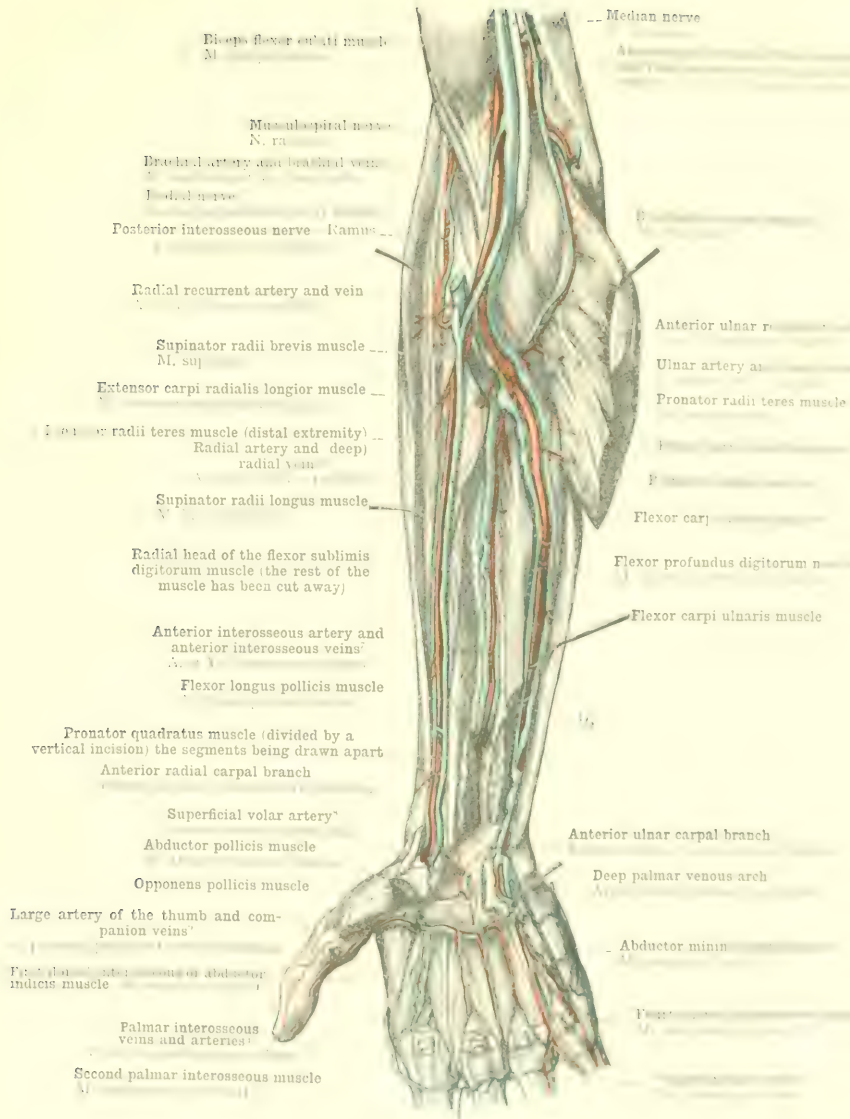
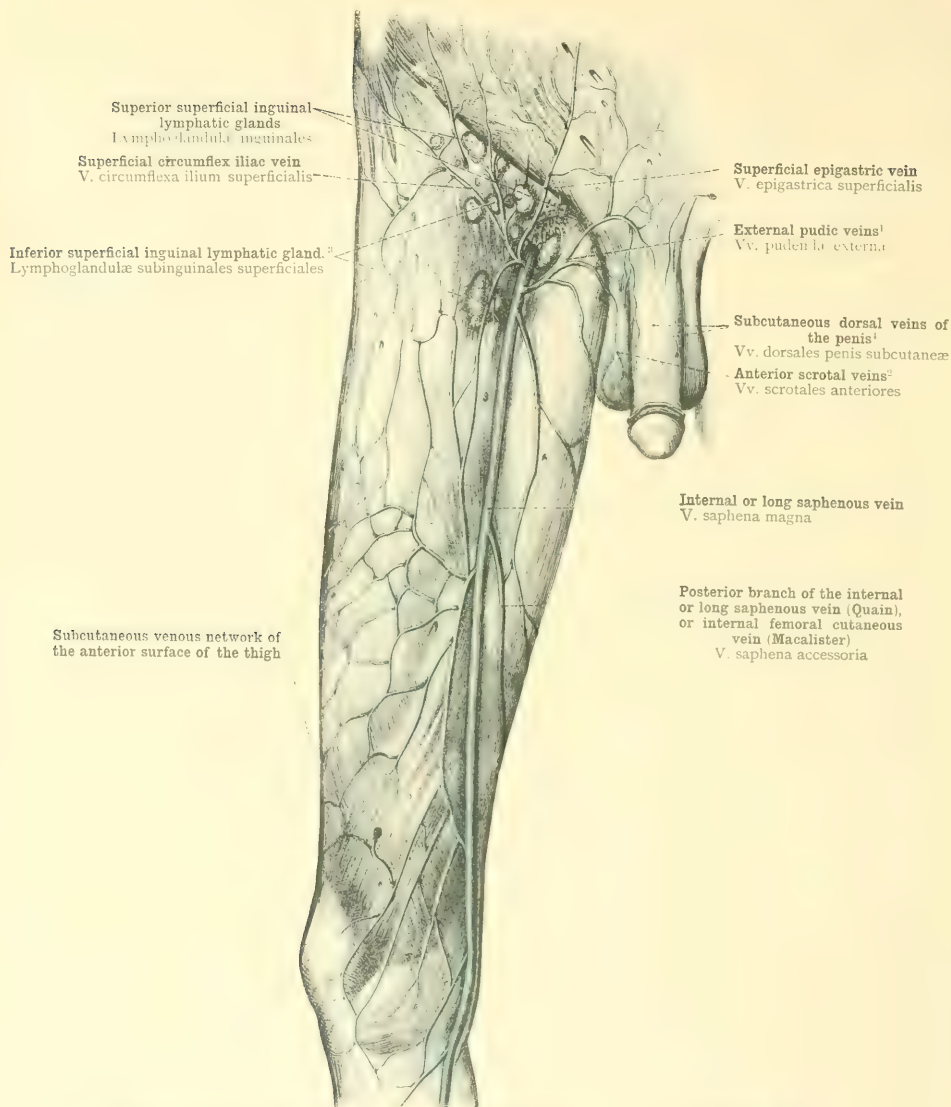


FIG. 1093.—THE DEEP VEINS AND ARTERIES OF THE FLEXURE OF THE ELBOW AND OF THE PALMAR SURF<sup>1</sup> OF THE FOREARM; THE SUPERFICIAL PALMAR ARTERIAL AND VENOUS ARCHES.



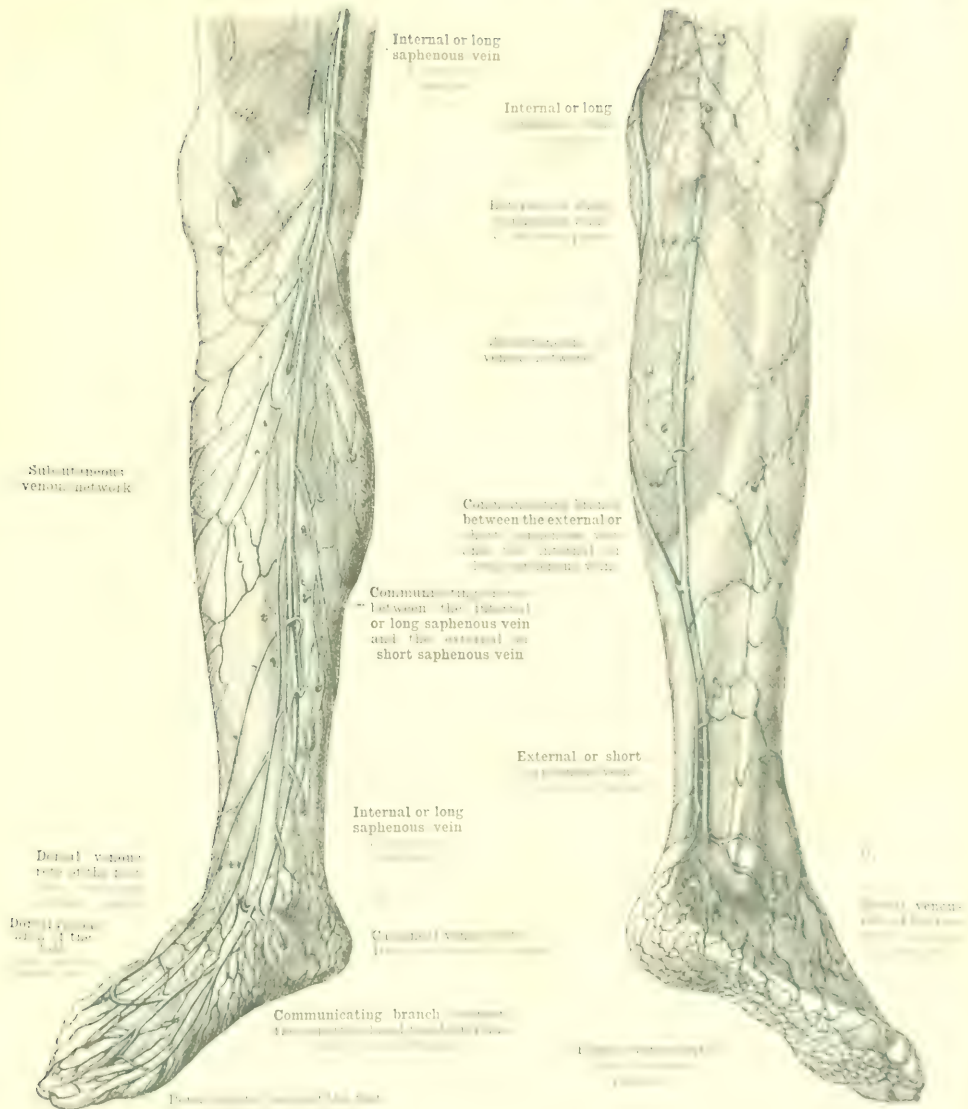


<sup>1</sup> According to Macalister, the internal or long saphenous vein, cutaneous branch, divides into the subcutaneous dorsal veins of the penis.

<sup>2</sup> See Appendix, ante.

PL. 1095.—THE CUTANEOUS VEINS OF THE ANTERIOR AND INNER SIDES OF THE RIGHT THIGH, OF THE LOWER PART OF THE FRONT OF THE ABDOMEN, AND OF THE MALE EXTERNAL GENITAL ORGANS. THE INTERNAL OR LONG SAPHEOUS VEIN WITH ITS POSTERIOR BRANCH (THE INTERNAL FEMORAL CUTANEOUS VEIN, ACCORDING TO MACALISTER), VENA SAPHENA MAGNA ET VENA SAPHENA ACCESSORIA; THE SUPERFICIAL LYMPHATIC GLANDS OF THE INGUINAL AND SUBINGUINAL REGIONS.





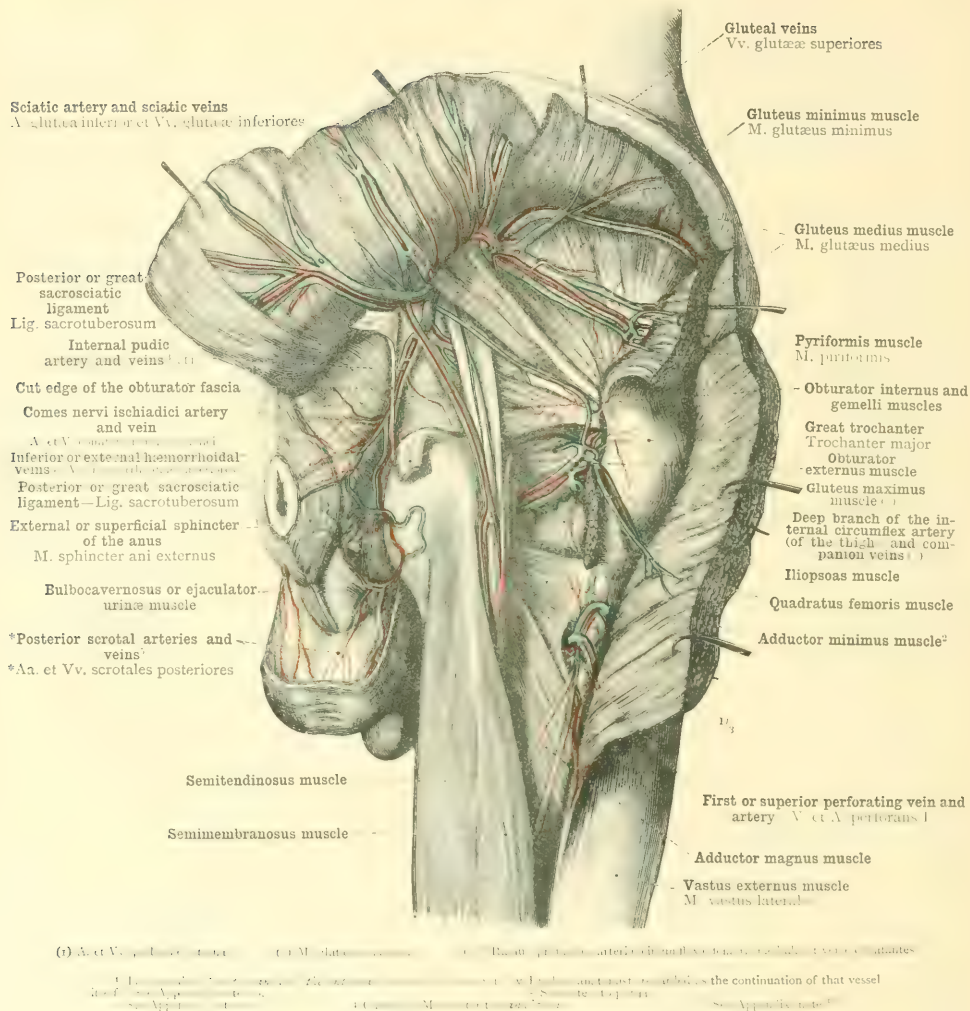
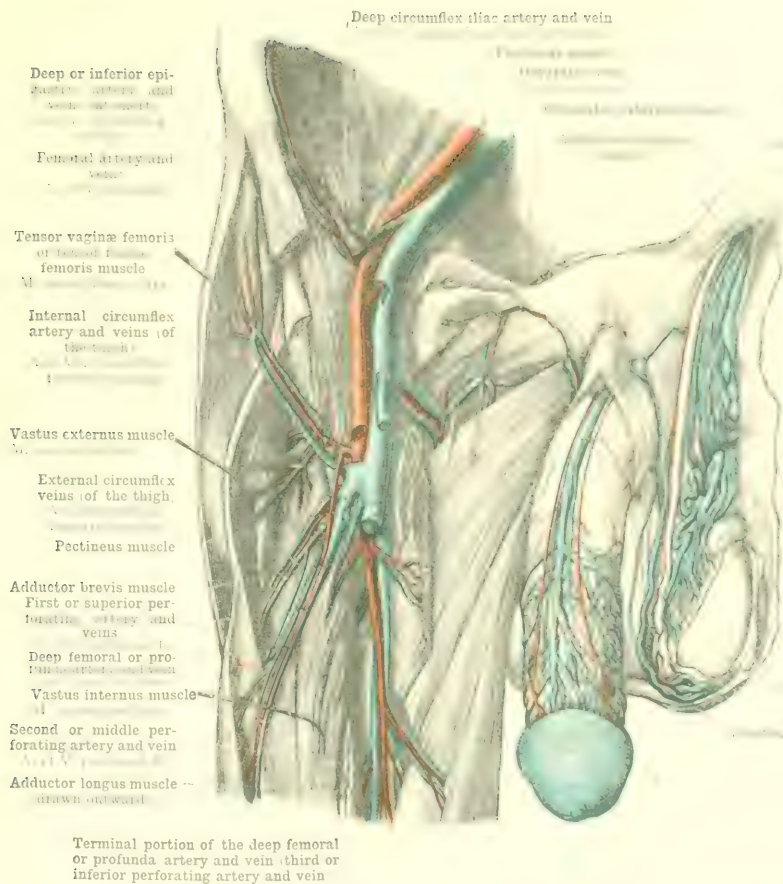


FIG. 1098.—THE DEEP VEINS AND ARTERIES OF THE RIGHT GLUTEAL REGION AND ISCHIORECTAL FOSSA, WITH THE SUPERFICIAL VESSELS OF THE POSTERIOR SURFACE OF THE SCROTUM.

The gluteus maximus and gluteus medius muscles and the posterior or great sacrosacral ligament were cut across and the segments were drawn apart, and the greater part of the quadratus femoris muscle was cut away.



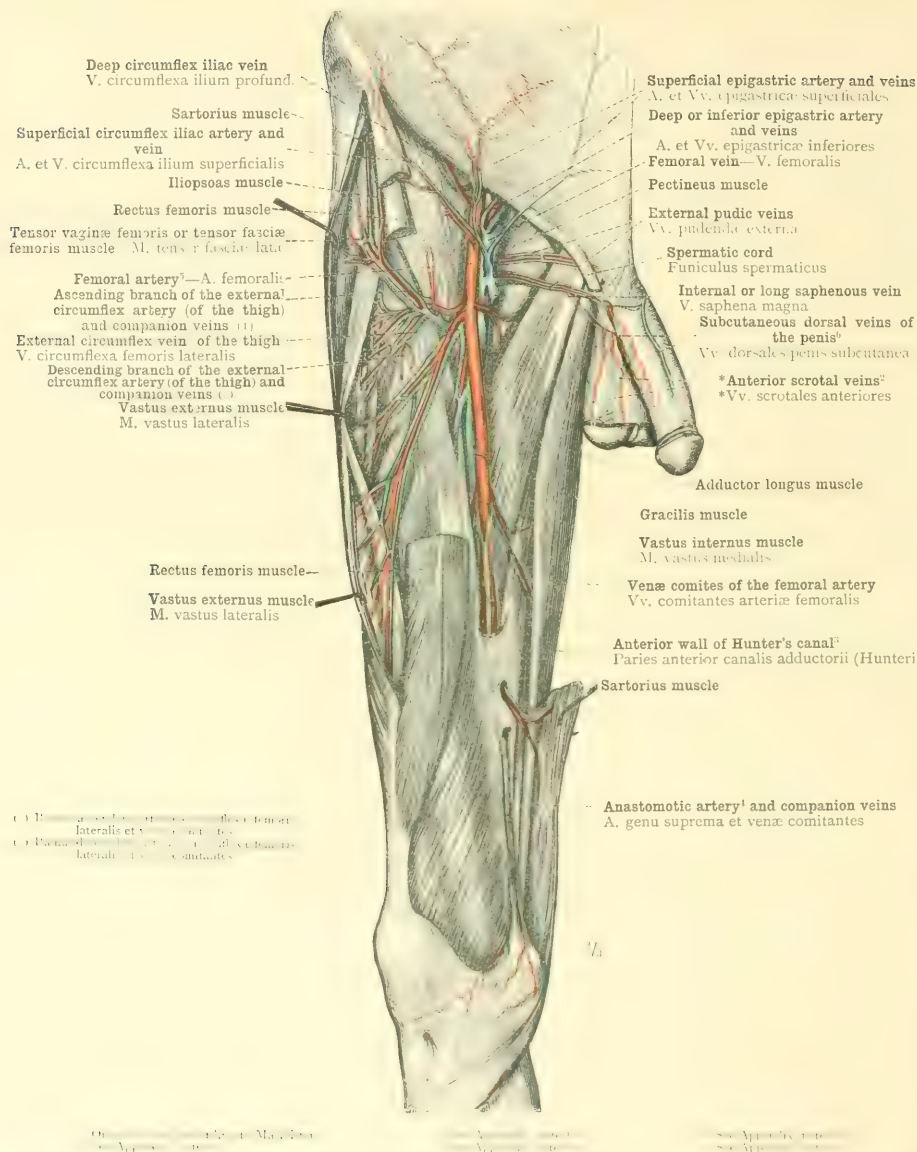
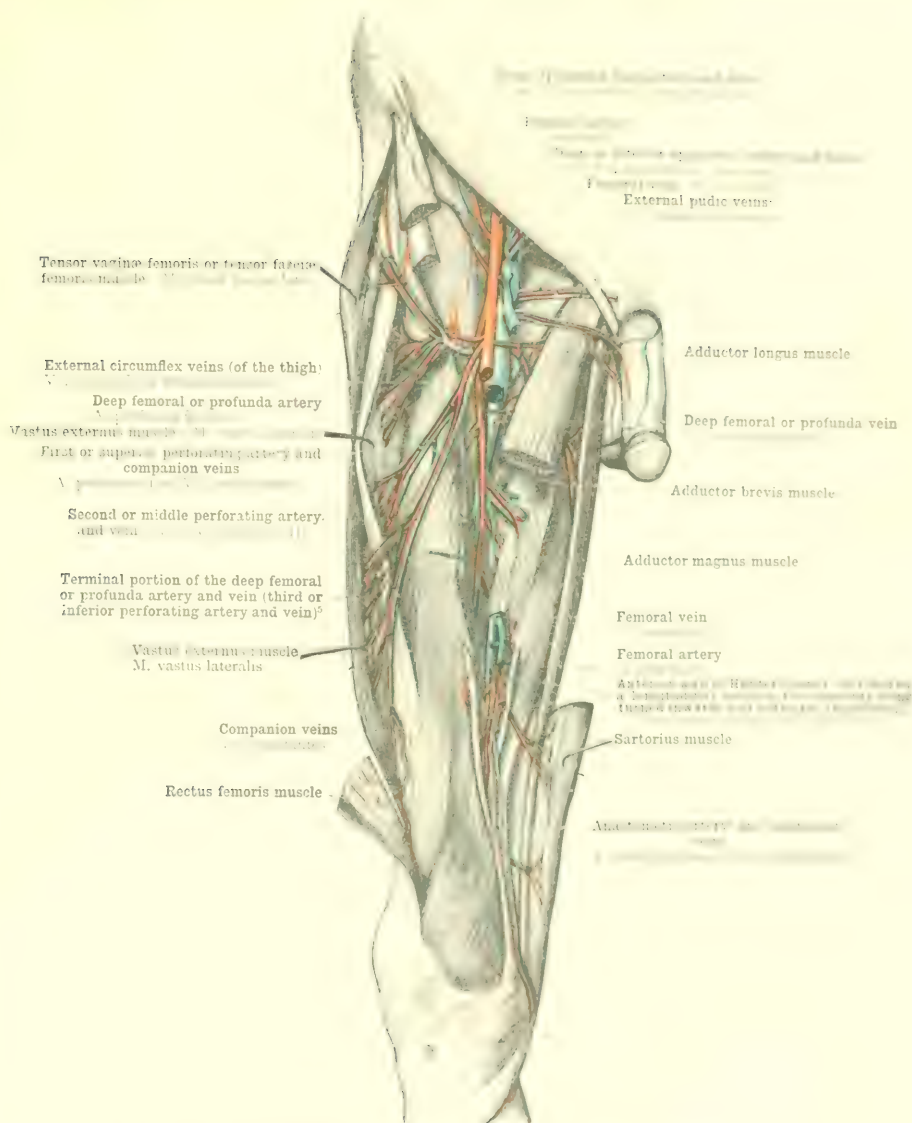


FIG. 100. THE FEMORAL ARTERY AND VEIN, ARTERIA ET VENA FEMORALIS, UNTIL THEIR ENTRANCE INTO HUNTER'S CANAL OR *Canalis adductorii*, AND THE DEEP VEINS OF THE EXTERNAL CIRCUMFLEX ARTERY AND VEIN (OF THE THIGH), ARTERIA ET VENA CIRCUMFLEXA FEMORIS LATERALIS. RIGHT THIGH, SEEN FROM BEFORE.

The sartorius and rectus femoris muscles were in part removed, and the tensor vaginæ femoris and vastus externus muscles were drawn outwards.

### Deep Veins of the Front of the Thigh.





Deep Vents on the Seafloor of the Pacific

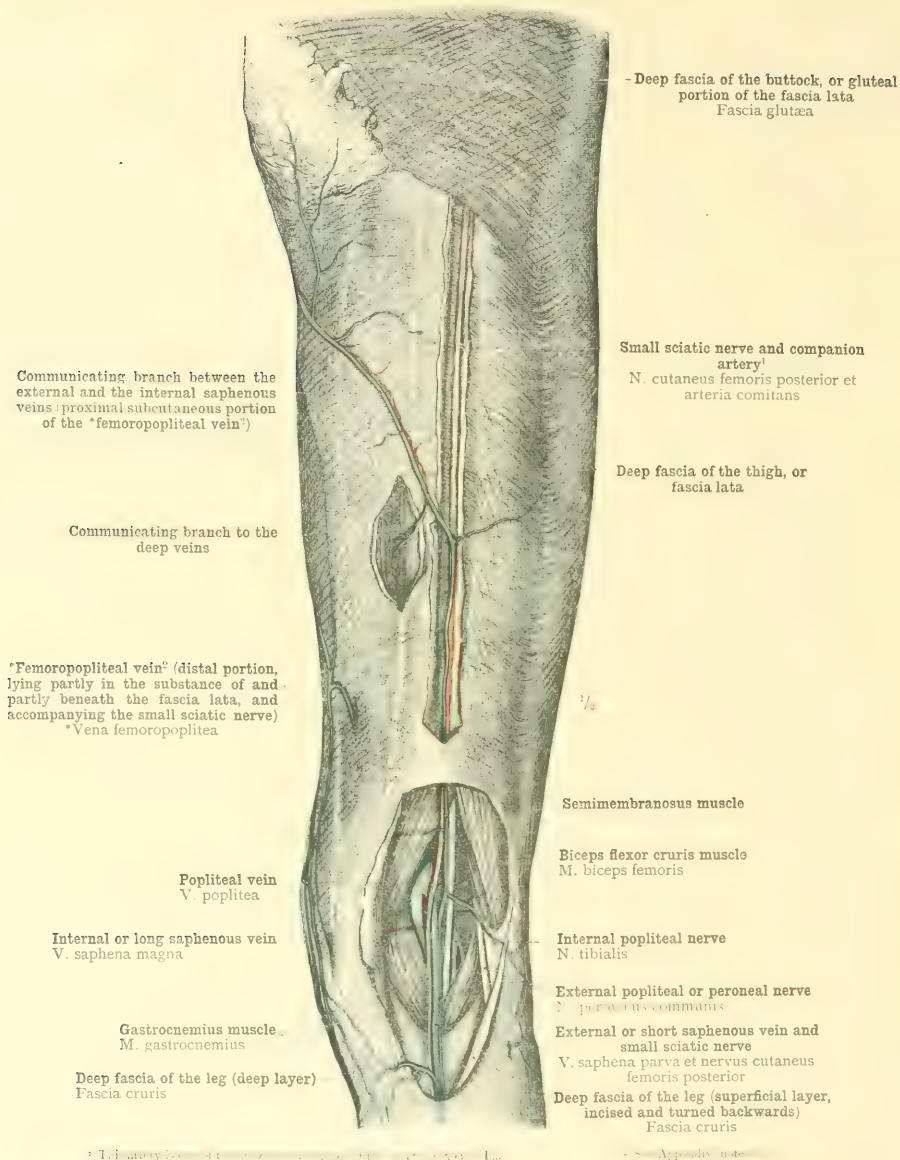


FIG. 1102.—THE \*FEMOROPOPLITEAL VEIN, \*VENA FEMOROPOPLITEA (see *Appendix, note 313*), OF THE RIGHT THIGH.

The small saphenous nerve (cutaneus femoris posterior), with its companion vessel, was exposed in its course between the layers of the fascia lata along the middle of the back of the thigh; and in the region of the ham the deep fascia was entirely removed.

### Superficial Veins of the Back of the Thigh.

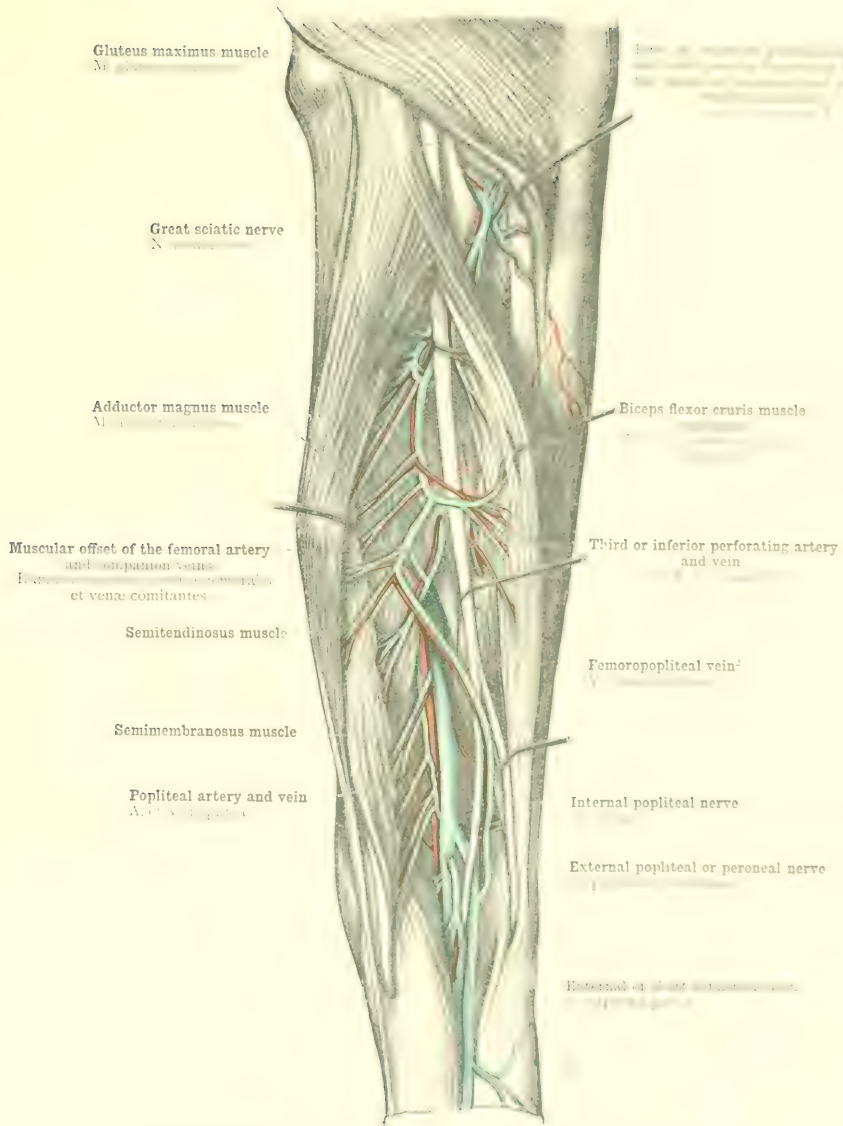


FIG. 149.—THE DEEP VEINS OF THE BACK OF THE THIGH.

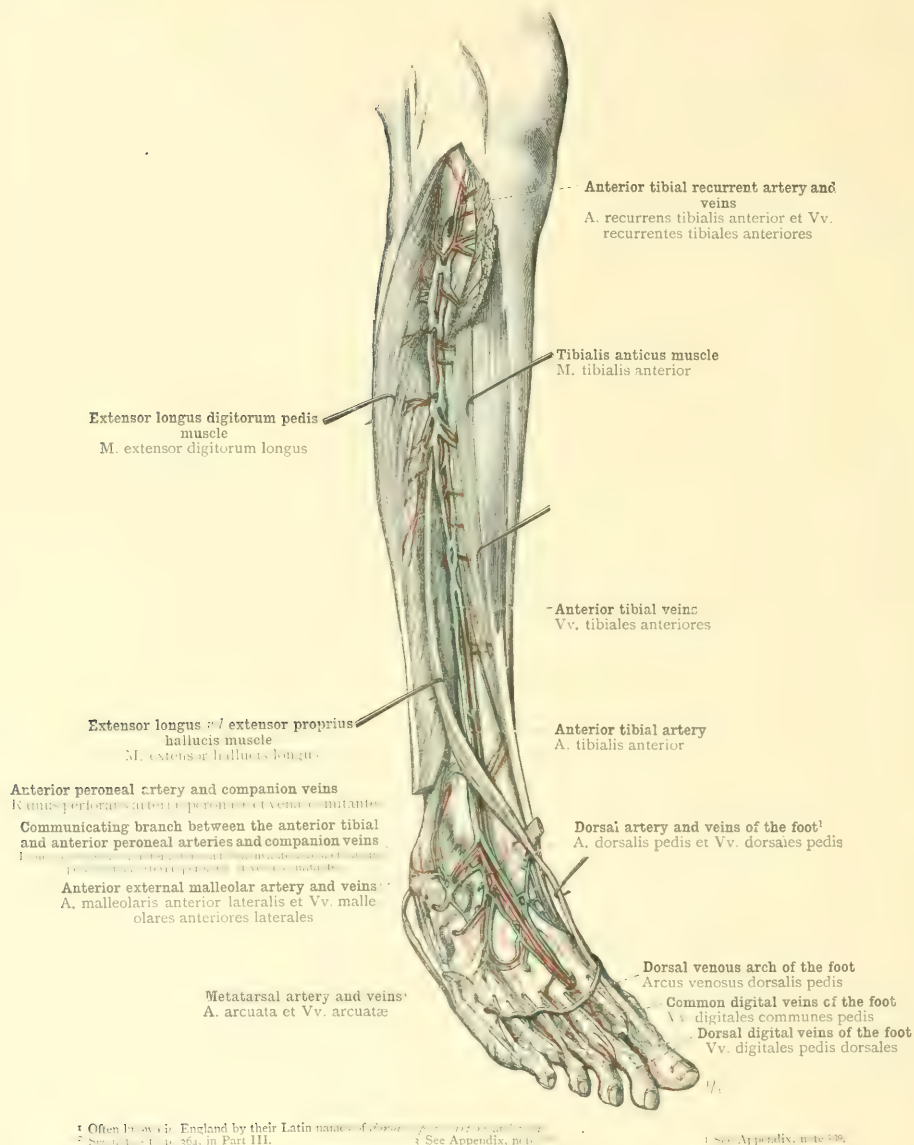
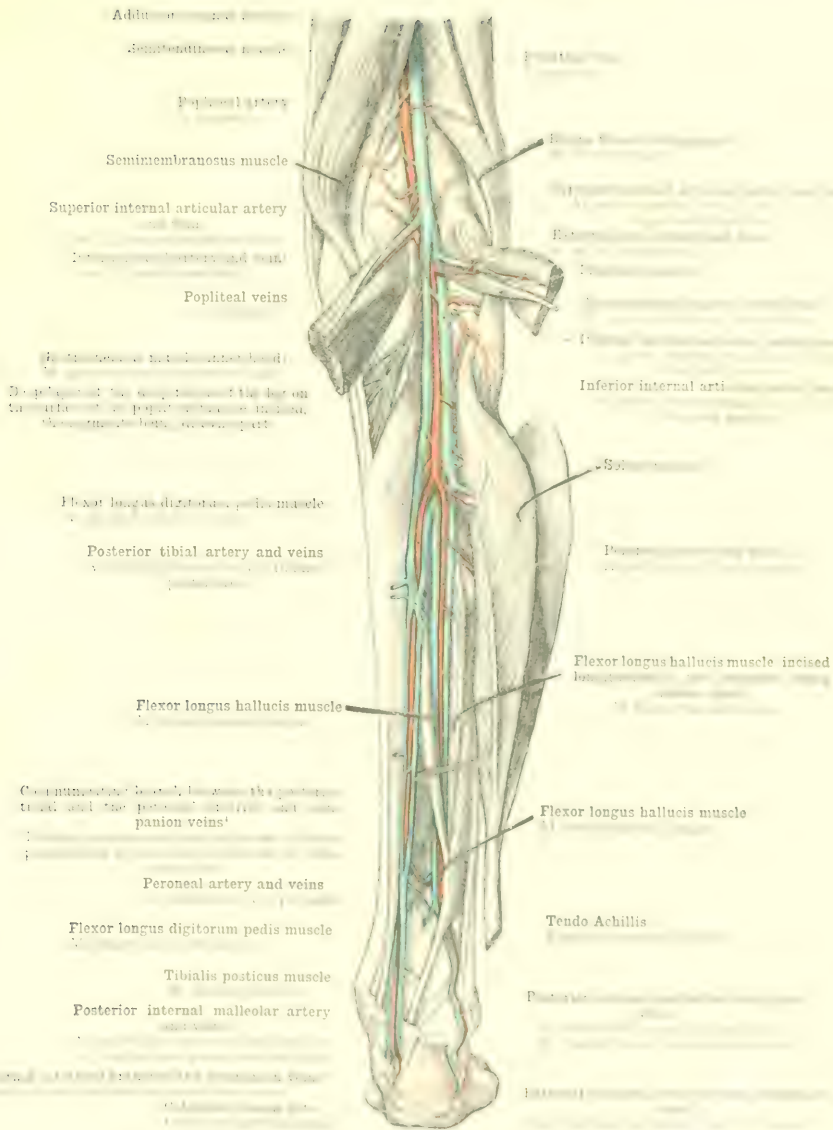
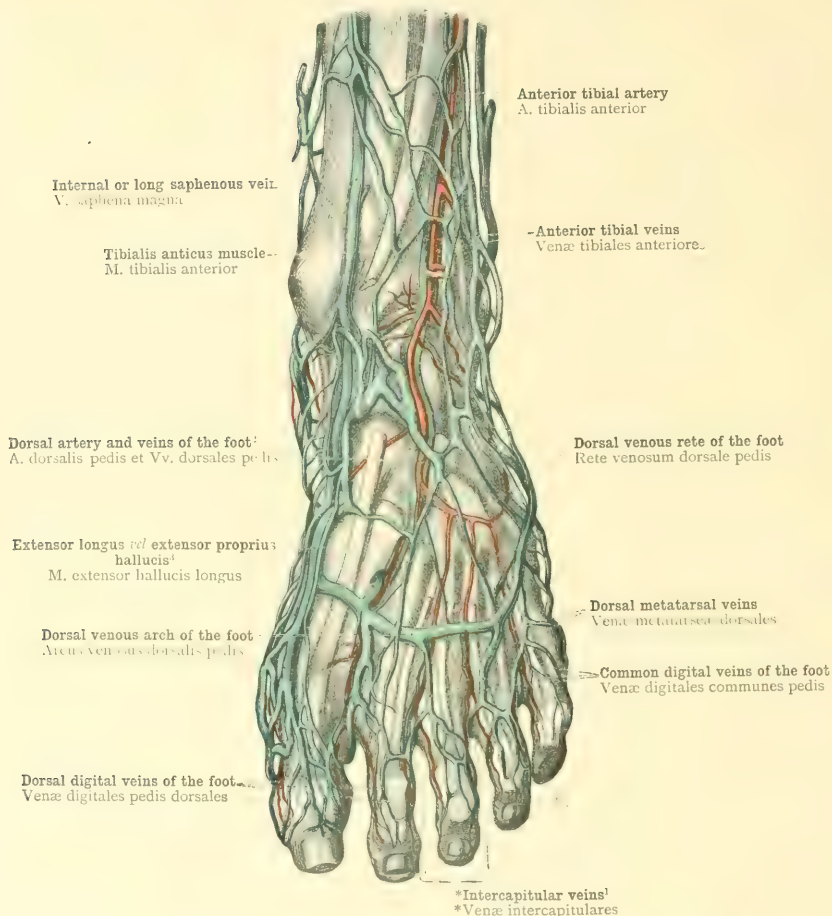


FIG. 114. THE MUSCLES OF THE FRONT OF THE LEG WERE SEPARATED, THE PROXIMAL PORTION OF THE TIBIALIS ANTICUS MUSCLE WAS DETACHED FROM THE BONE AND TURNED FORWARDS, THE EXTENSOR DIGITORUM PEDIS MUSCLE AND THE TENDONS OF THE EXTENSOR LONGUS DIGITORUM PEDIS MUSCLE WERE REMOVED FROM THE DORSUM OF THE TARSUS.







<sup>1</sup> The \*Intercapitular veins of the foot are not shown in the hand. See Appendix, note 10.  
<sup>2</sup> On the medial side of the foot, the \*Intercapitular veins are not shown.

FIG. 1106.—THE SUPERFICIAL VEINS AND THE DEEP VEINS AND ARTERIES OF THE DORSUM OF THE FOOT: THE DORSAL DIGITAL VEINS OF THE FOOT, VENÆ DIGITALES PEDIS DORSALES, AND THE COMMON DIGITAL VEINS OF THE FOOT, VENÆ DIGITALES COMMUNES PEDIS; THE DORSAL METATARSAL VEINS, VENÆ METATARSÆ DORSALES, AND THE \*INTERCAPITULAR VEINS OF THE FOOT, VENÆ INTERCAPITULARES (PITTS); THE DORSAL VENOUS ARCH OF THE FOOT, ARCUS VENOSUS DORSALIS PEDIS, AND THE DORSAL VENOUS RETE OF THE FOOT, RETE VENOSUM DORSALE PEDIS; THE CONTINUITY OF THE DORSAL VEINS OF THE FOOT, VENÆ DORSALES PEDIS, WITH THE ANTERIOR TIBIAL VEINS, VENÆ TIBIALES ANTERIORES; THE INTERNAL OR LONG SAPHENOUS VEIN, VENA SAPHENA MAGNA.

Of the muscles of the front of the leg, the tibialis anticus muscle only was retained; on the dorsum of the foot, the extensor brevis digitorum pedis muscle was removed, but the distal extremities of the tendons of the extensor longus digitorum pedis muscle were retained.

#### Veins of the Dorsum of the Foot.







SYSTEMA LYMPHATICUM  
THE LYMPHATIC SYSTEM

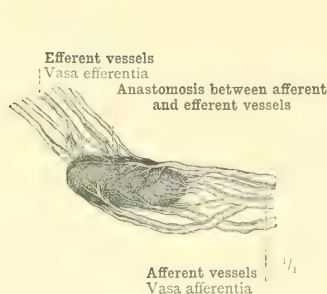


FIG. 1108.—LYMPHATIC GLAND (HUMAN) FROM THE INTERNAL ILIAC GROUP, OF WHICH THE AFFERENT AND EFFERENT VESSELS HAVE BEEN INJECTED.

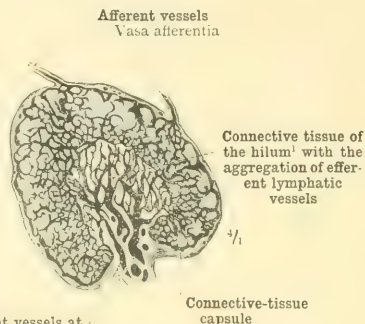


FIG. 1109.—TRANSVERSE SECTION THROUGH ONE OF THE INTERNAL ILIAC LYMPHATIC GLANDS OF MAN IN WHICH THE LYMPHATIC VESSELS HAVE BEEN INJECTED WITH PRUSSIAN BLUE AND THE GLAND HAS SUBSEQUENTLY BEEN HARDENED IN ALCOHOL.

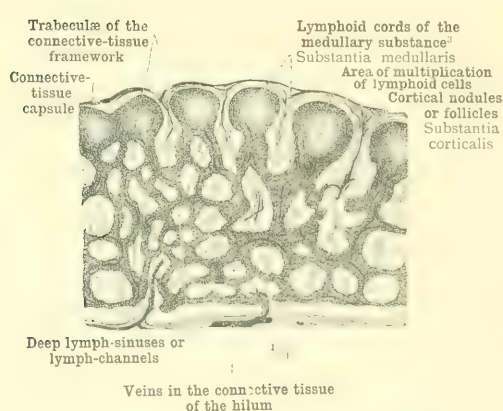


FIG. 1110.—SECTION OF A MESENTERIC LYMPHATIC GLAND, HARDENED IN ALCOHOL.

The bloodvessels, which were injected with Prussian blue, are tinted deep black.

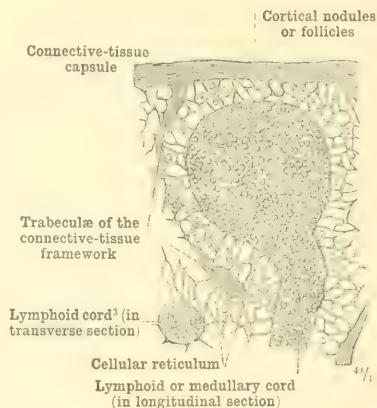


FIG. 1111.—CORTICAL NODULES OR FOLLICLES AND LYMPHOID OR MEDULLARY CORDS OF A MESENTERIC LYMPHATIC GLAND, SEEN IN TRANSVERSE SECTION, AND MAGNIFIED FORTY DIAMETERS.

<sup>1</sup> Connective-tissue of the Hilum.—"In the center of the hilum, where the afferent vessels leave the gland, the trabeculae combine with the connective-tissue capsule to form a dense, vascularized connective-tissue, the *hilum connective-tissue*, in the interior of which the afferent lymphatic vessels are aggregated." (See Foster, *op. cit.*, p. 100, fig. 100, etc.) For the term *hilum connective-tissue* which I have introduced by the phrase "connective-tissue of the hilum," see p. 100.

<sup>2</sup> Or medullary cords (Foster).

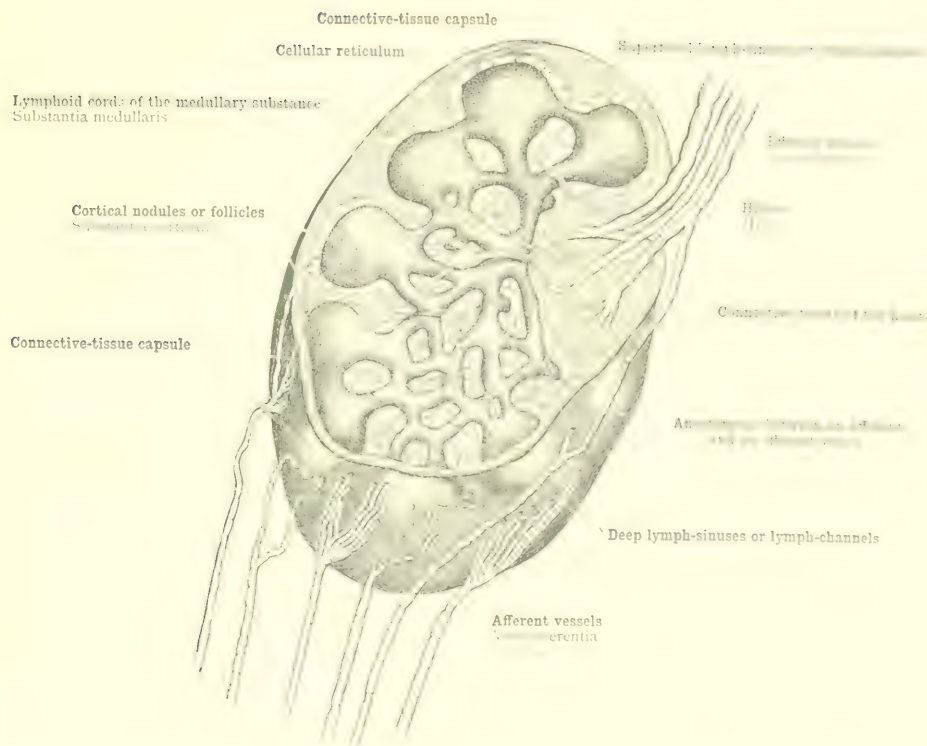


FIG. 1122.—DIAGRAMMATIC REPRESENTATION OF THE INTERNAL STRUCTURE OF A LYMPHATIC GLAND, WITH AFFERENT AND EFFERENT LYMPHIC VESSELS, AND A REPRESENTATION OF THE CELLULARITY.

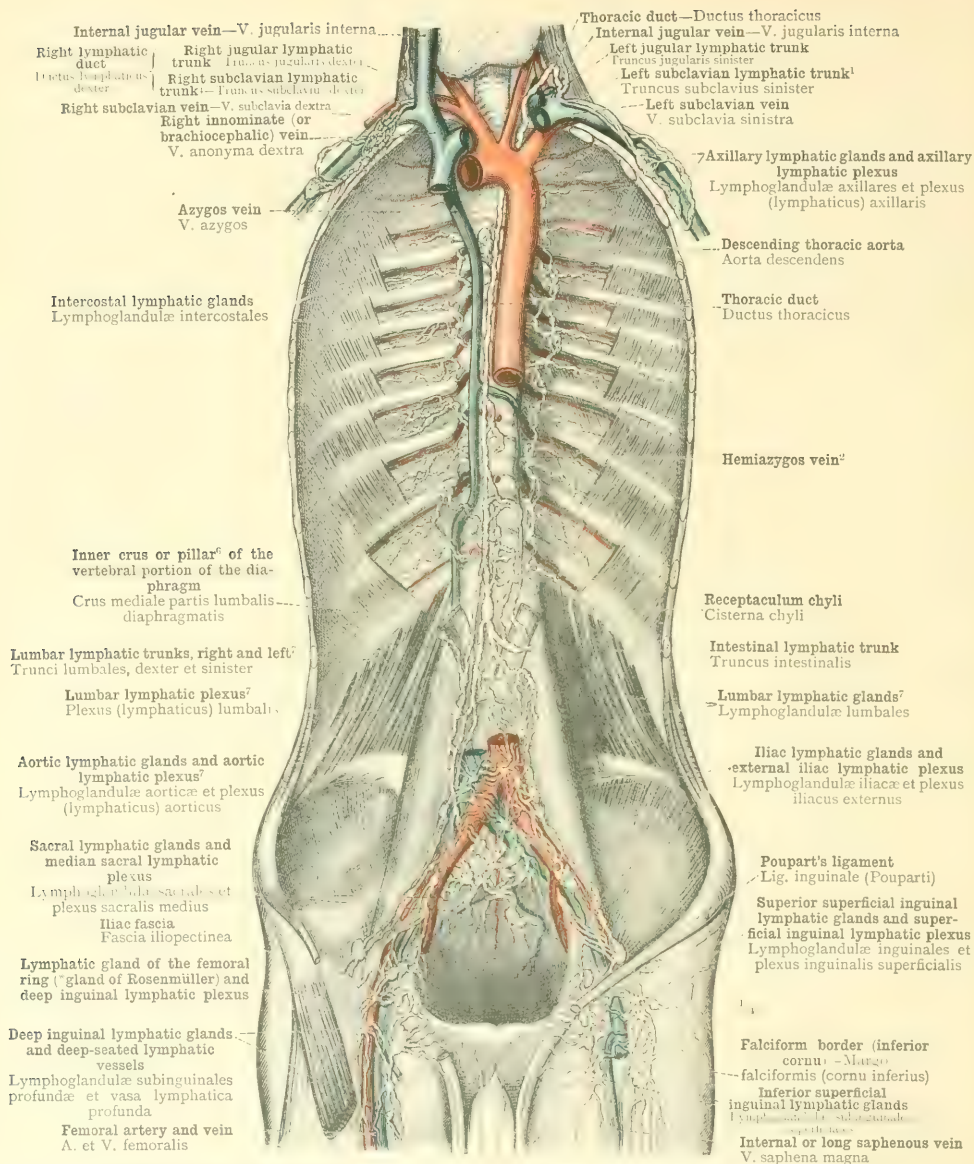


FIG. 1113.—THE THORACIC DUCT, DUCTUS THORACICUS, AND THE LYMPHATIC TRUNKS OPENING INTO THAT VESSEL; THE LYMPHATIC VESSELS AND LYMPHATIC GLANDS OF THE POSTERIOR WALL OF THE ABDOMEN; THE SUPERFICIAL AND DEEP LYMPHATIC VESSELS AND LYMPHATIC GLANDS OF THE GROIN.

Ductus thoracicus—The thoracic duct.



Small intestine  
Intest. H. mes. (artery)

Lacteals  
V. chylifera

Intestinal artery and  
vein

Mesenteric lymphatic glands  
L. mes. (artery)

Mesentery  
M. (artery)

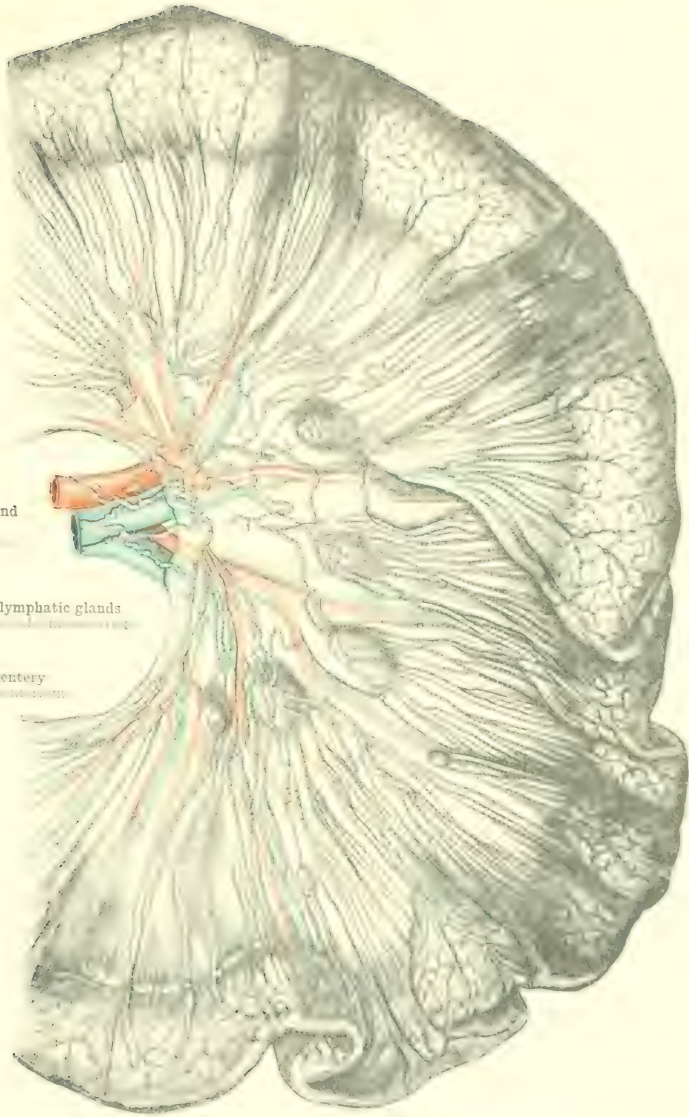


FIG. 1014.—THE LACTEAL ARCH OF THE MESENTERY. (Lymphoglandulae mesentericae.)  
L. mes. (artery) = L. mes. (artery) = L. mes. (artery) = L. mes. (artery) = L. mes. (artery)

Vasa chylifera—Lacteals.—Lymphoglandulae mesentericae—Mesenteric lymphoglandulae

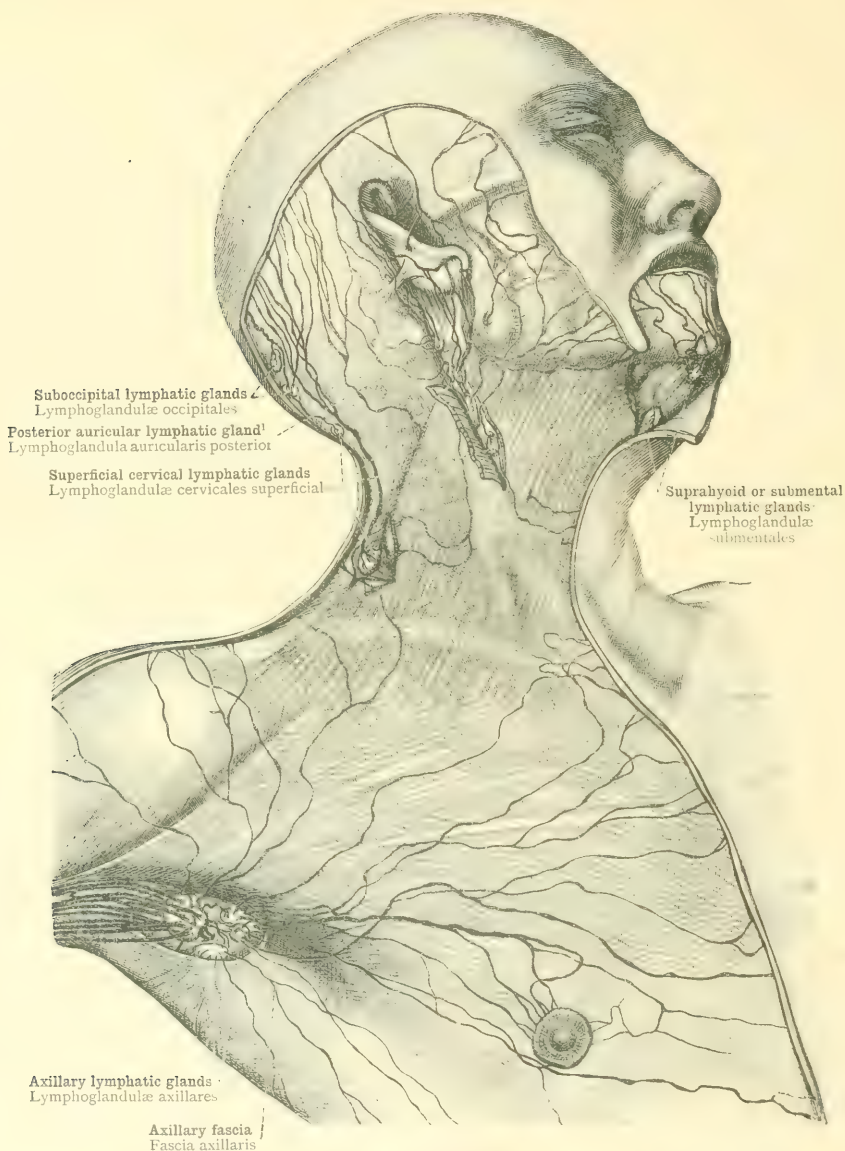
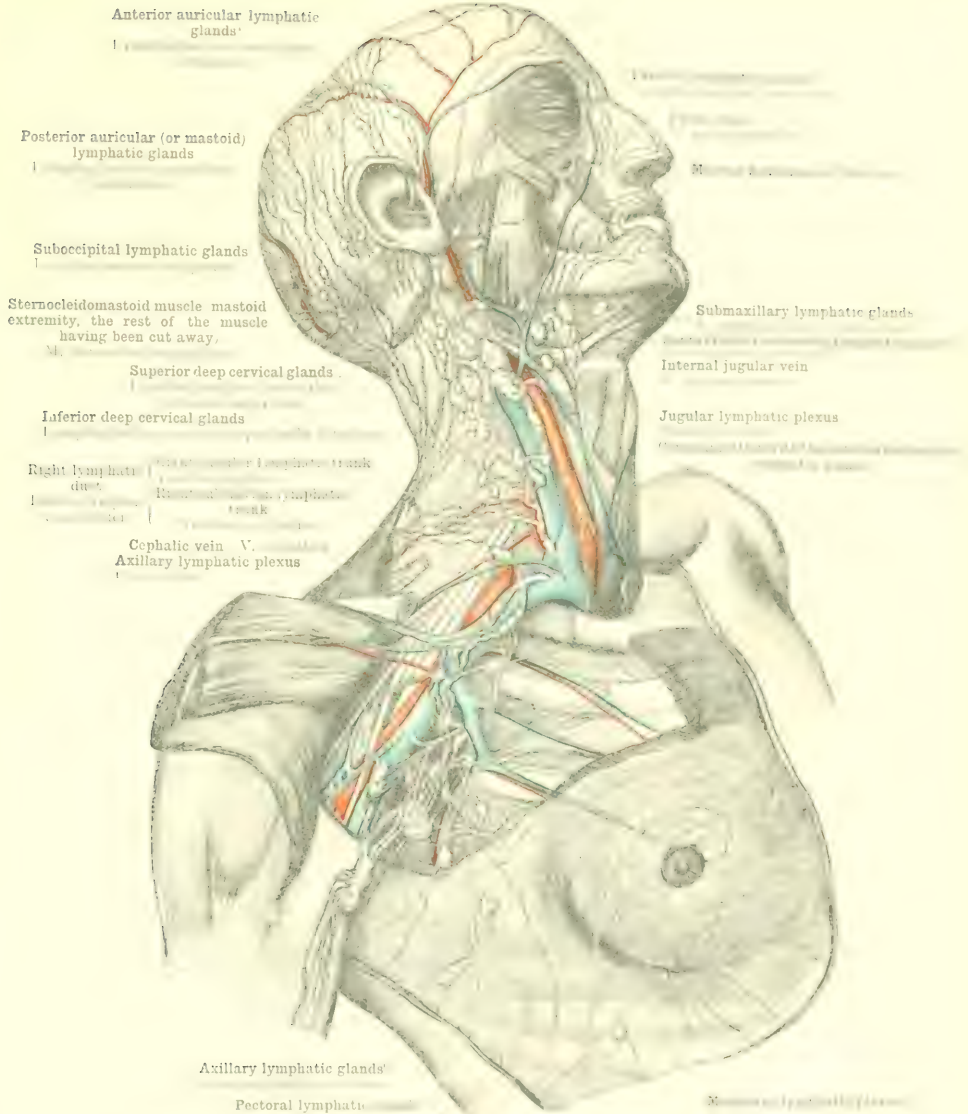


FIG. 1115.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE HEAD AND NECK, AND OF THE UPPER THORACIC AND THE HUMERAL REGIONS, WITH THE SUPERFICIAL LYMPHATIC GLANDS WITH WHICH THEY ARE CONNECTED.

Lymphatic Vessels of the Head, the Neck, and the Anterior Wall of the Thorax.



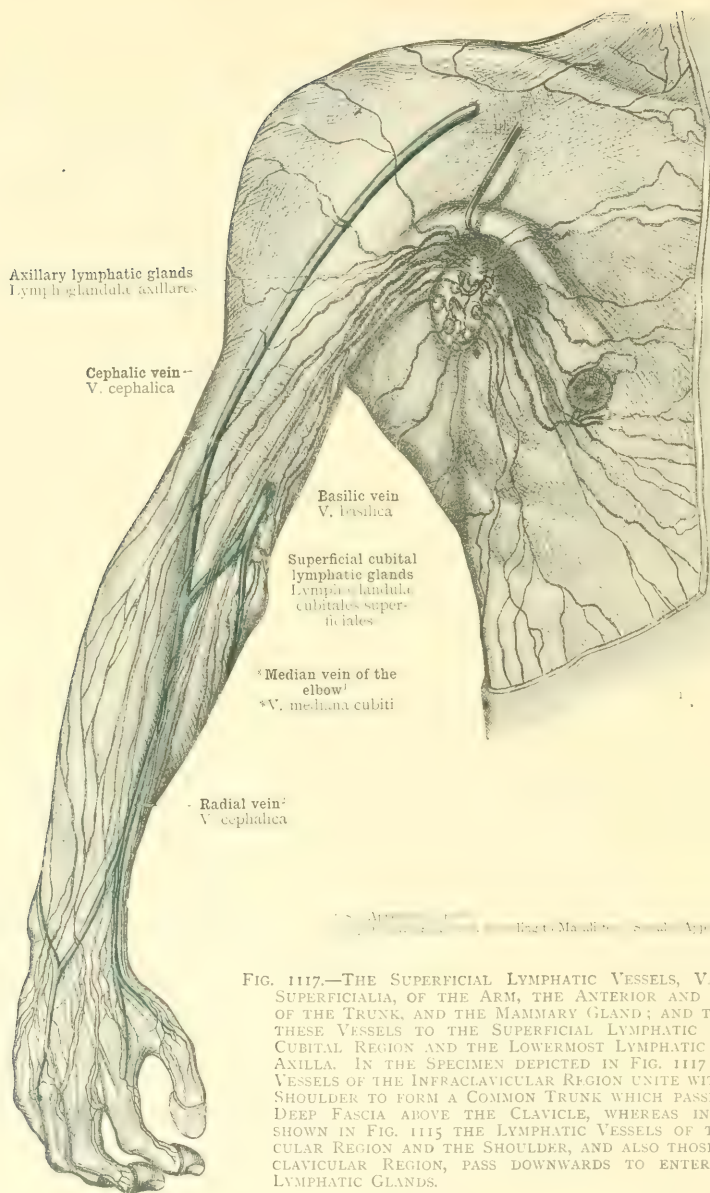


FIG. 1117.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE ARM, THE ANTERIOR AND LATERAL WALLS OF THE TRUNK, AND THE MAMMARY GLAND; AND THE RELATION OF THESE VESSELS TO THE SUPERFICIAL LYMPHATIC GLANDS OF THE CUBITAL REGION AND THE LOWERMOST LYMPHATIC GLANDS OF THE AXILLA. IN THE SPECIMEN DEPICTED IN FIG. 1117 THE LYMPHATIC VESSELS OF THE INFRACLAVICULAR REGION UNITE WITH THOSE OF THE SHOULDER TO FORM A COMMON TRUNK WHICH PASSES BENEATH THE DEEP FASCIA ABOVE THE CLAVICLE, WHEREAS IN THE SPECIMEN SHOWN IN FIG. 1115 THE LYMPHATIC VESSELS OF THE INFRACLAVICULAR REGION AND THE SHOULDER, AND ALSO THOSE OF THE SUPRA-CLAVICULAR REGION, PASS DOWNWARDS TO ENTER THE AXILLARY LYMPHATIC GLANDS.

Lymphatic Vessels of the Upper Limb and the Anterior and Lateral Walls of the Trunk.



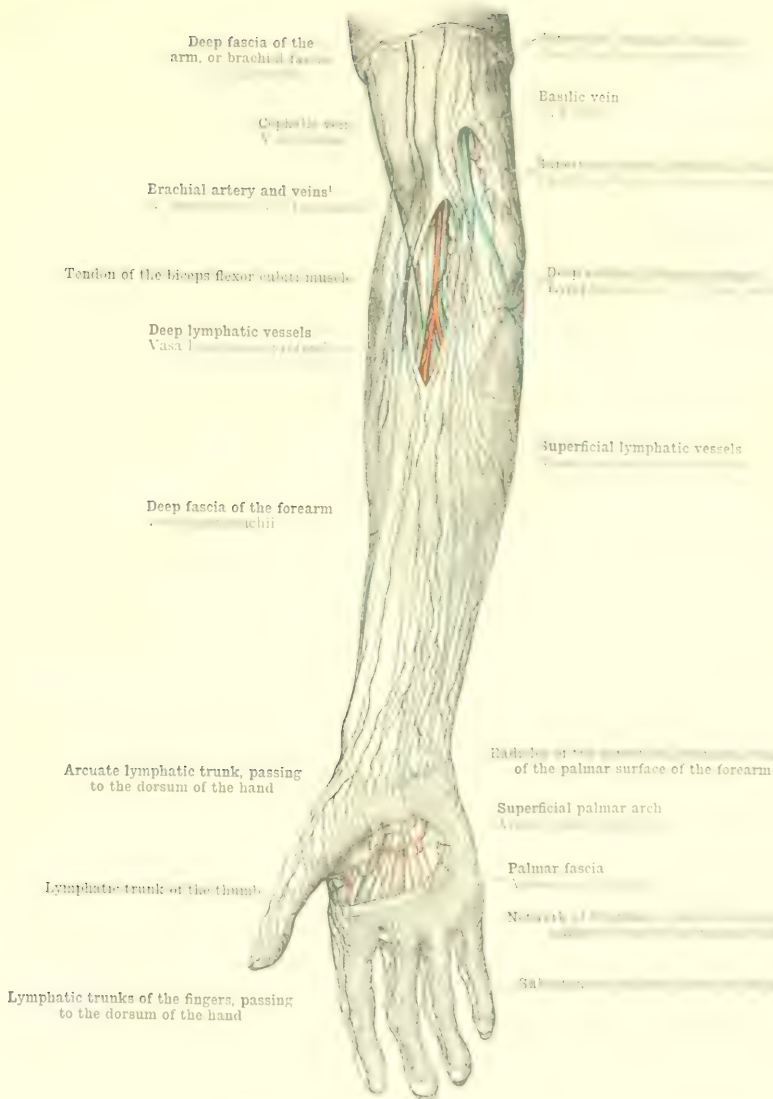


FIG. 111. Lymphatic Vessels of the Upper Limb. (From the collection of the Anatomical Museum of the University of Chicago, and the collection of the Anatomical Museum of the University of Michigan.)

Poupart's ligament (superficial crural arch)  
 Lig. inguinale (Pouparti)  
 Superior superficial inguinal lymphatic glands  
 Lymphoglandulæ inguinales  
 Femoral artery—A. femoralis  
 Femoral vein—V. femoralis  
 Falciform border  
 Margo falciformis  
 Inferior superficial inguinal lymphatic glands  
 Lymphoglandulæ subinguinales superficiales

Internal or long saphenous vein  
 V. saphena magna



Deep inguinal lymphatic gland—Lymphoglandula subinguinalis profunda  
 Posterior branch of the internal or long saphenous vein (Quain) or internal femoral cutaneous vein (Macalister)  
 V. saphena accessoria

FIG. III9.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE INGUINAL REGION, THE MALE EXTERNAL GENITAL ORGANS, AND THE ADJOINING PORTIONS OF THE THIGH AND ABDOMEN, WITH THE ASSOCIATED LYMPHATIC GLANDS; THE SUPERFICIAL INGUINAL LYMPHATIC PLEXUS.

The superior cornu of the falciform border and part of the internal or long saphenous vein were removed.

Superficial Lymphatic Vessels and Glands of the Inguinal Region and the Male External Genital Organs.

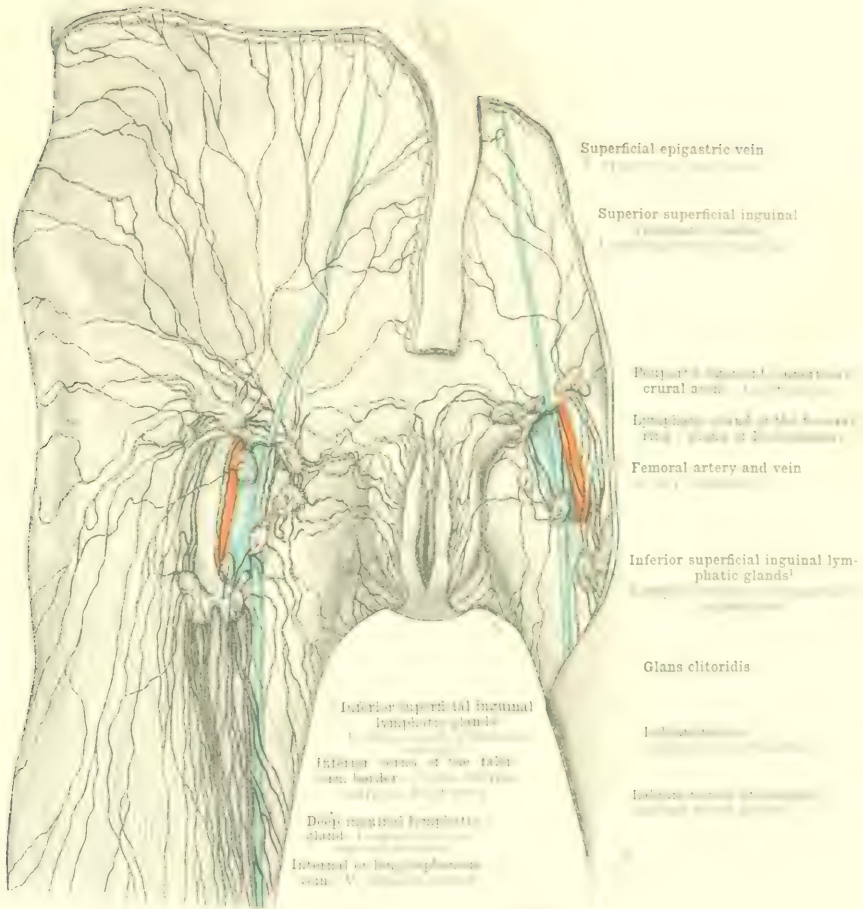


FIG. 100.—THE SUPERFICIAL LYMPHATIC VESSELS AND LYMPHATIC GLANDS OF THE RIGHT THIGH AND GROIN, WITH THE ASSOCIATED VEINS AND ARTERIES. (FROM THE COLLECTION OF THE MUSEUM OF THE ROYAL ANATOMICAL SOCIETY, LONDON.)

Superficial Lymphatic Vessels and Glands of the Inguinal Region and the Female External Genital Organs.

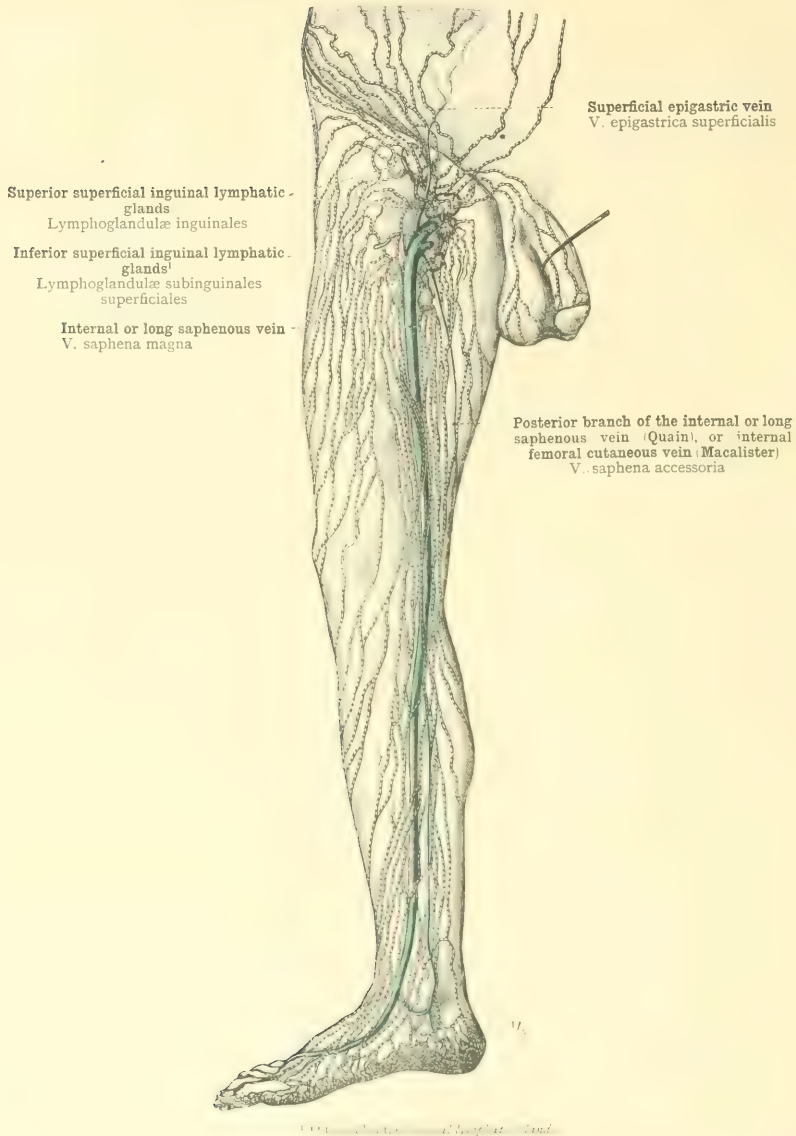


FIG. 1121.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE RIGHT LOWER LIMB, THE MALE EXTERNAL GENITAL ORGANS, AND THE ANTERIOR WALL OF THE ABDOMEN, WITH THE SUPERIOR SUPERFICIAL INGUINAL LYMPHATIC GLANDS, LYMPHOGLANDULÆ INGUINALES, AND THE INFERIOR SUPERFICIAL INGUINAL LYMPHATIC GLANDS (OFTEN CALLED THE FEMORAL LYMPHATIC GLANDS), LYMPHOGLANDULÆ SUBINGUINALES SUPERFICIALES. SEEN FROM BEFORE AND THE INNER SIDE.

The lymphatic vessels were injected with metallic mercury.

### Lymphatic Vessels of the Lower Limb.



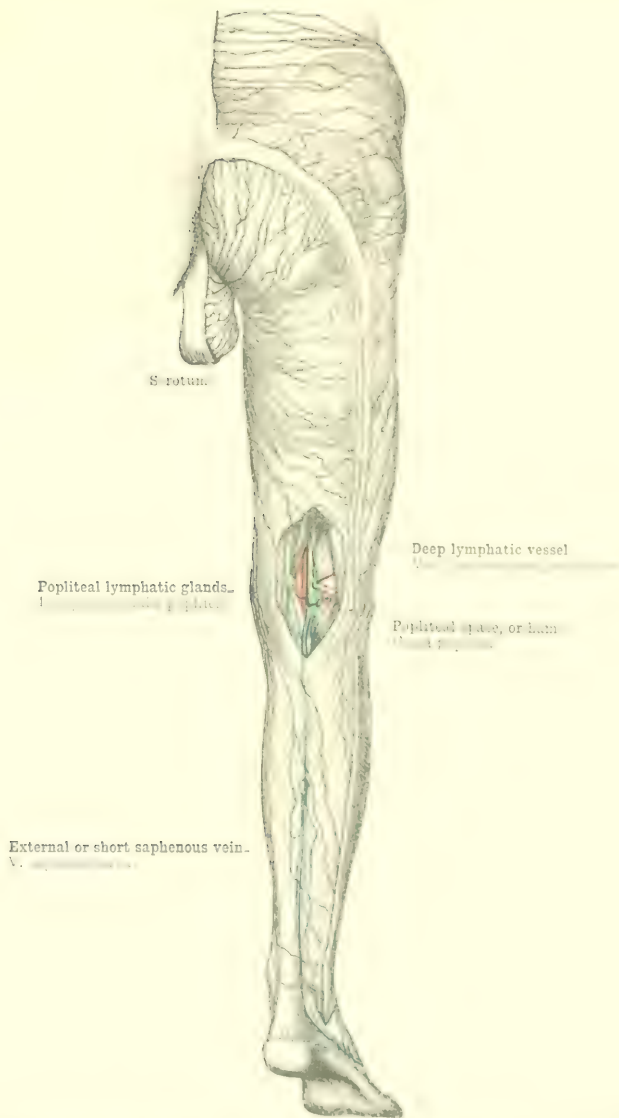


FIG. 10. THE LYMPHATIC SYSTEM OF THE LOWER LIMB. THE LYMPHATIC VESSEL IN THE LOWER LIMB.

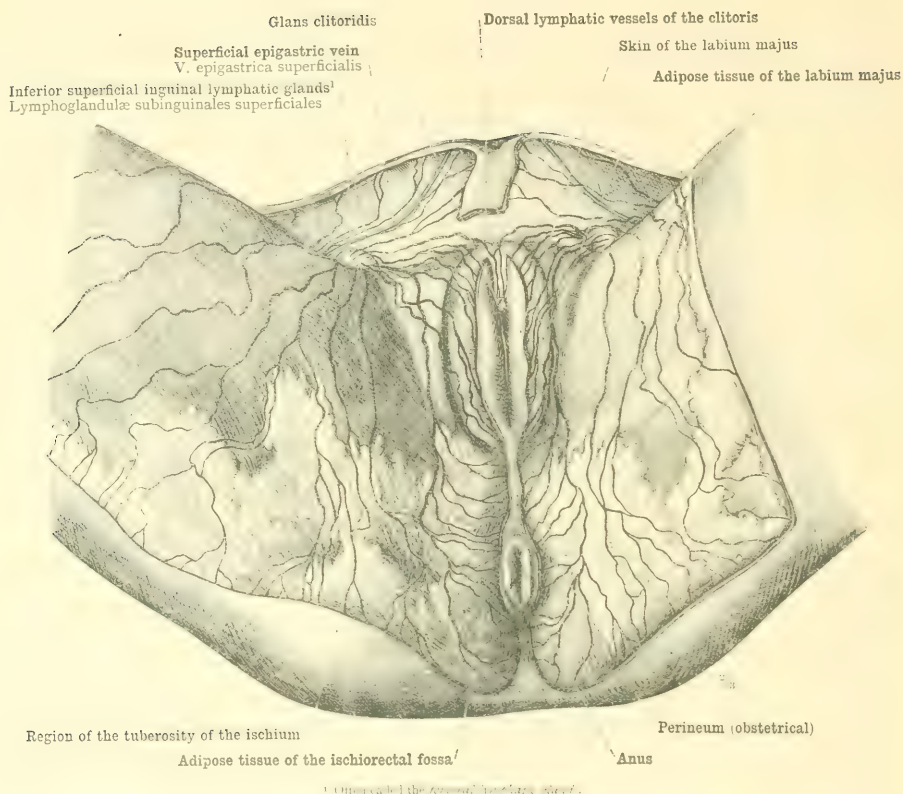


FIG. 1123.—THE SUPERFICIAL LYMPHATIC VESSELS, VASA LYMPHATICA SUPERFICIALIA, OF THE PERINEAL REGION AND THE FEMALE EXTERNAL GENITAL ORGANS.

In order to expose the dorsal lymphatic vessels of the clitoris (both in this specimen and in that depicted in Fig. 1120), the anterior commissure of the vulva was divided and the prepuce of the clitoris removed, so as to lay bare the body of that organ.

Superficial Lymphatic Vessels of the Perineal Region.

## APPENDIX TO PART V.

## NOTES BY TRANSLATOR

little to the left of the bifurcation of the main trunk, upwards and posteriorly to the bifurcation of the second trunk, and downwards to the bifurcation of the third trunk, total area 1.5 cm<sup>2</sup>. The trunk bifurcations were marked with a black ink (Fig. 1).

[illegible]

er) were originally applied to what in fact had been called the external ear of the bat. The structure is not so dissimilar to the external ear of many mammals. The antennae of the bat are used in a way very different from the way in which they are used in other insects. It is used in their primitive

In England the term *auricle* has, by metonymy, come to denote the external ear as well as the internal part of the organ; the same probably holds true elsewhere.

...; nomenclature, however, the distinction ...

\* The main part of the annule, that into wh

jugal foramen (see Fig. 1080, p. 685). According to Langer, however, the bulb does not belong to the internal jugular vein, but is to be regarded as the convexity of a sharp bend formed by the lateral sinus before it terminates in the vein. The *bulbus vena jugularis inferior* of Toldt is the dilated inferior extremity of the internal jugular vein, just above its junction with the subclavian vein.

<sup>122</sup> *Plica Vena Cava Sinistra* (Fig. 974, p. 584).—This is a fold of pericardium, called by Marshall the *vestigial fold*, lying between the left pulmonary artery and the subjacent pulmonary vein. It encloses a vestige of the left superior vena cava (*duct of Cuvier*) of the fetus in the form of a strand of fibrous tissue. From its inferior extremity the *oblique vein of Marshall* runs across the back of the left auricle to open into the coronary sinus. See note <sup>117</sup> above.

<sup>123</sup> *Jugular Venous Arch* (Ibid.). This term is not used by Quain or Macalister. It is applied by the author to the *communicating branch* in the *suprasternal space* (*Buon's space*) between the two *anterior jugular veins*, and to those portions of the *anterior jugular veins* below this *communicating branch* which run outwards on each side behind the origin of the sternocleidomastoid muscle to open into the lower end of the *external jugular vein*. A transverse venous arch is thus formed at the root of the neck between the *external jugular veins*.

<sup>124</sup> (Fig. 975, p. 585).—In the normal development of the great veins, it is this communicating branch, often called the *transverse jugular vein*, which forms the greater part of the definitive left innominate vein.

<sup>125</sup> *Angulus Venosus* (Ibid.). The name *venous angle*, *right*, and *left*, is given by the author to the junction on the respective sides of the neck of the internal jugular and subclavian veins, normally to form the innominate veins; in the specimen shown in Fig. 975, however, to form the superior vena cava (right and left).

<sup>126</sup> *Lumbar Arteries* (Fig. 981, p. 592).—These are usually five in number on each side, of which the upper four regularly arise from the aorta, and sometimes the fifth also; but quite often this artery, *arteria lumbalis ima*—the *lowest lumbar artery*—is, as in the present specimen, a branch of the *middle sacral artery*, or *sacral aorta*.

<sup>127</sup> (Ibid.) The *middle sacral artery* represents the caudal prolongation of the aorta met with in lower mammals, and its lateral branches are homologous with the intercostal and lumbar arteries; hence the name *sacral aorta*, used by Macalister. According to the terminology of this author (*op. cit.*, p. 428), "At the sacrococcygeal joint the artery becomes *middle coccygeal*, or *caudal*, and is continued downwards to the tip of the coccyx, where its terminal branch passes outwards to end in the coccygeal glomerulus." In Toldt's nomenclature, however, as in that of Quain the *middle sacral artery* *terminates* *in the coccygeal gland or glomerulus (glomus coccygeum)*. This structure is shown in Fig. 1299, p. 534, Part IV.

<sup>128</sup> *Space Between Aorta* (Ibid.). The space between the dotted lines pointing to the *ascending aorta* and the *arch of the aorta* in Fig. 981 is occupied by the *great sinus of the aorta*, which is not mentioned by the author. The aorta is first of a trefoil shape, owing to the presence of the *sinuses of Toldt*, then becomes circular, then elliptical, the upper part of the ascending aorta and the commencement of the arch being dilated to form the *great sinus*, the long axis of whose ellipse is directed backwards and to the left. The dilatation varies in size in different bodies, is usually better marked in elderly persons, and

occasionally is not to be detected. Before the *aortic isthmus*, the lumen of the tube again becomes circular. See also Fig. 951, p. 569.

<sup>129</sup> *Spermatic Artery* (Ibid.).—This artery is called by the author *arteria spermatica interna*, to distinguish it from the *arteria spermatica externa*—the *cremasteric artery* of English anatomists.

<sup>130</sup> *Arteria Hepatica Propria* (Fig. 983, p. 594).—According to the author's nomenclature, the hepatic artery breaks up into a *descending division*, *arteria gastroduodenalis*, and an *ascending division*, *arteria hepatica propria*. The latter gives off the *arteria gastrica dextra* (pyloric artery), and then breaks up into a *ramus sinister* and *ramus dexter* (the left and right hepatic arteries). The term *arteria hepatica propria* has no English equivalent, the artery, from its origin from the coeliac axis to its division into right and left hepatic arteries, being called simply the *hepatic artery*.

<sup>131</sup> *Pyloric Artery* (Ibid.).—This, the *arteria gastrica dextra* of the author, is called by Macalister the *superior pyloric artery*, to distinguish it from a small branch, usually unnamed, of the *gastro-duodenal artery*, but called by him the *inferior pyloric artery*.

<sup>132</sup> *Ramus Costalis Lateralis* (Fig. 988, p. 599).—"Among the branches of the internal mammary artery, a not unimportant and somewhat common variety is the existence of the *ramus costalis lateralis* this arises just above the first rib from the internal mammary trunk, runs obliquely downwards and backwards on the inner surface of the wall of the thorax as far as the fifth or sixth rib, and gives offsets in the intercostal spaces which anastomose with branches of the intercostal arteries" (Von Langer and Toldt's "Anatomy," p. 513). Quain (*op. cit.*, vol. ii., p. 429) calls this the *lateral branch* of the internal mammary artery, and states that when present it runs "about midway between the spine and sternum, or somewhat further forward." Macalister calls it the *lateral infra-costal branch*, and remarks: "The existence of this vessel must be remembered in paracentesis. I have seen it of enormous size in cases of obliteration of the dorsal aorta from the pressure of an intrathoracic tumour" ("Anatomy," p. 554).

<sup>133</sup> *Inner Mammary Branches* (Ibid.).—"The perforating branches (of the internal mammary artery) of the third, fourth, and fifth spaces in the female give *rami mammarii* to the breast" (Von Langer and Toldt, *op. cit.*, p. 513). In Fig. 988, it is the *anterior perforating branch* of the second right space that furnishes the largest of these mammary branches.

<sup>134</sup> (Ibid.) The *origin of the branches of the subclavian artery* is so variable that it is difficult to decide which arrangement is to be regarded as normal. Von Langer and Toldt describe the *thyroid axis* as supplying four branches: the *inferior thyroid*, the *ascending cervical*, the *superficial cervical*, and the *suprascapular*. Quain states that the *thyroid axis* divides into "the *inferior or ascending thyroid*, the *suprascapular*, and a third branch, which is either the *transverse cervical*, or one of the branches into which that artery, when present, divides—viz., the *superficial cervical*" (the other being the *posterior scapular*). Here, however, we see a trunk, called by Toldt the *superficial cervical*, dividing into the *transverse cervical* and (presumably) the *posterior scapular*. Macalister uses the name *posterior scapular* as synonymous with *transverse cervical*, and regards the common origin of the *superficial cervical* and the *posterior scapular* as one of the most frequent arrangements. (See also note <sup>135</sup> below.)

<sup>135</sup> (Ibid.) According to Quain's nomenclature, this trunk would be called the *transverse cervical*, while of the two branches into which it divides, the lower, called here *transversa colli*, is the *superficial cervical*, the upper, apparently, the *posterior scapular*. (See also note <sup>134</sup> above and notes <sup>132</sup> and <sup>398</sup> below.)

<sup>136</sup> (Ibid.) According to the usual English nomenclature, this





nomenclature, the *artery of the penis* as soon as it leaves the ischioerectal fossa (see note <sup>141</sup> above), so, in the female, it becomes the *artery of the clitoris*, which gives off the *artery of the bulb* (*arteria bulbi vestibuli*—see Fig. 994, p. 605, and Fig. 997, p. 607) to the vaginal bulb or bulb of the vestibule, and terminates by dividing into the *artery of the corpus cavernosum of the clitoris* (*arteria profunda clitoridis*) and the *dorsal artery of the clitoris* (*arteria dorsalis clitoridis*).

<sup>137</sup> *Superficial or Long Perineal Artery* (Fig. 994, p. 605).—In the female, this artery is considerably larger than in the male, as will be seen by a comparison of Fig. 994, p. 605, with Fig. 991, p. 602. The foremost of the branches indicated by the author in Fig. 994 as *arteria hemorrhoidales inferiores* represents the *transverse perineal artery* of English anatomists—see notes <sup>147</sup> and <sup>148</sup> above.

<sup>138</sup> (Ibid.) Represented here by several twigs, instead of the single stem normally given to the anus by the internal pudic artery, and called by Macalister the *anal artery*. But see also the second sentence in note <sup>137</sup> above.

<sup>139</sup> *Bulbus Vestibuli* (Ibid.).—Regarding the nomenclature of this structure, see Appendix to Part IV., note 91.

<sup>140</sup> *Vaginal Arteries* (Fig. 995, p. 606).—The arrangement of these in this specimen is worthy of note. The *uterine artery*, after crossing beneath the ureter and then running parallel with it for a considerable distance, gives off two branches which pass in front and behind the ureter, respectively, and then turn upwards to unite again into a considerable branch of the *internal pudic artery*. From the two arches thus formed, numerous small offsets are given to the vagina and the lower part of the bladder. For an account of the normal arrangement of the *vaginal arteries*, see note <sup>163</sup> below.

<sup>141</sup> (Ibid.) The *left ilio-lumbar artery* in this specimen is very much smaller than usual, and arises from the common iliac artery, instead of, as is normally the case, from the internal iliac prior to its breaking up into anterior and posterior divisions.

<sup>142</sup> *Arteriae Vesicales* (Ibid.).—The arteries called *vesical* in Fig. 995 are the terminal offsets merely, not the *vesical arteries* proper. No *superior vesical artery* is depicted in this specimen; and the *inferior vesical artery* (or *vesicovaginal artery*) is represented by the branch of the *internal pudic artery* which contributes to form the arterial arches mentioned in note <sup>140</sup> above.

<sup>143</sup> *Vaginal Arteries* (Fig. 997, p. 608).—The upper part of the vagina (with the cervix uteri) is supplied by a special branch of the *uterine artery*, and it is this branch which in the left side of Fig. 997 is by the author denominated the *vaginal artery*. The lower part of the vagina is separately supplied. In the right side of Fig. 997 the author depicts *vaginal arteries* for this region arising from the *internal pudic artery*; in Fig. 995, p. 606, a somewhat similar arrangement is shown; while in Fig. 994, p. 607, a larger branch for the lower part of the vagina arises in common with the *internal pudic*. According to Quain ("Anatomy," 10th ed., vol. ii., part ii., p. 474), "the *vaginal artery* (*vesicovaginal*) in the female corresponds to the *inferior vesical artery* (*vesicoprostatic*) in the male. Arising from the anterior division of the *internal iliac*, or frequently from the *uterine artery*, it descends and ramifies upon the vagina, sending at the same time offsets to the lower part of the bladder, to the bulb of the vestibule, and to the contiguous part of the rectum. It anastomoses behind the vagina with the corresponding artery of the opposite side." The fact is that the vagina is normally supplied with blood from both the sources mentioned, the branch from the *uterine* (which might be termed the *superior vaginal artery*) and the branch from the *inferior vesical artery* (which might be termed the *inferior vaginal artery*) varying inversely with one

another in size. In Fig. 997 is shown a slender vertically disposed artery occupying the median line of the posterior surface of the vagina; this is often much larger than in the specimen here figured, being supplied by offsets from both the *superior* and the *inferior vaginal arteries*, and is termed the *azygos artery of the vagina*. It is well shown in a plate by Hyrtl, reproduced as plate vi. of Hart and Barbour's "Gynecology," 3rd ed., 1886, facing p. 68.

<sup>144</sup> (Fig. 998, p. 610.) The *ophthalmic artery* terminates by dividing into the *frontal* and *nasal* branches. Macalister follows the Continental terminology in speaking of the latter as the *arteria dorsalis nasi*.

<sup>145</sup> *Angular Artery* (Ibid.).—The *facial artery* is described by English anatomists as terminating usually by division into the *lateral nasal* and *angular arteries*, the latter being the slender twig which inosculates at the inner side of the orbit with the *nasal branch of the ophthalmic artery*. Toldt, however, gives the name of *arteria angularis* to the *facial* as soon as it has given off the *coronary artery of the upper lip*, and the *lateral nasal artery* is not mentioned by him. The last-named artery in the present specimen is represented by two or three slender twigs seen ramifying on the side of the nose.

<sup>146</sup> *Facial Artery* (Ibid.).—Quain gives *external maxillary*, and Macalister *external mandibular*, as an alternative name for this artery; but it is so rarely in England called anything but the *facial artery* that I have not thought it necessary to mention these synonyms in the text. Conversely, the *internal maxillary* is sometimes, though rarely, spoken of as the *deep facial artery*.

<sup>147</sup> (Ibid.) The *hyoid branch of the lingual artery* usually runs along the upper border of the hyoid bone (in the figure, however, along the outer side of the great cornu), and is called by Macalister the *suprahyoidæan artery*.

<sup>148</sup> (Ibid.) Very often called the *temporal artery*, without qualification. It has, however, to be distinguished from the *anterior* and *posterior deep temporal branches of the internal maxillary artery*, and from its own middle *deep temporal* (middle temporal) branch.

<sup>149</sup> *Sternocleidomastoid Artery* (Ibid.).—This is described by Von Langer and Toldt as a special branch arising from the posterior side of the *external carotid artery* above the hyoid bone, and arching downwards and outwards to enter the inner side of the sternocleidomastoid muscle. It is described also by Macalister, but not by Quain. It varies inversely in size with the *sternocleidomastoid branches of the occipital and superior cervical arteries*, and is sometimes absent.

<sup>150</sup> *Acromial Rete* (Ibid.).—This name is sometimes given to the arterial network formed on the upper surface of the acromion by anastomosing branches of the *acromiothoracic*, *suprascapular*, and *posterior circumflex arteries*. I may add that the word *rete* in this section of the "Atlas" is used without qualification only in speaking of *arterial retia*. The *venous retia* are always distinguished by the qualifying adjective.

<sup>151</sup> *Arteria Labialis Inferior* (Fig. 999, p. 611).—Macalister describes the *inferior labial artery* as dividing into two branches: an upper, the *inferior coronary artery*, which runs near the free margin of the lower lip; and a lower, the *superficial mental artery*. Quain mentions the *inferior labial artery* and the *coronary artery of the lower lip* as being sometimes distinct branches of the *facial artery*, but sometimes arising in common from that artery.

<sup>152</sup> *Arteria Transversa Colli* (Ibid.).—Fig. 999 shows what the author describes as the normal distribution of the branches of the subclavian artery, in which the *superficial cervical artery* arises from the *thyroid axis*, while the *transverse cervical artery*, arising

important, from the administrative perspective, of the original survey, the decision-making, the financial aspects, support, access to the equipment [10] and the implementation and the evaluation of the project [11].

anguli, "angle of the jaw" (cf. *angulus*, "angle near the eye") and represents the form of the bone in the upper part of the scapula, "the other forms the posterior scapular" (*op. cit.*, vol. ii, p. 10). In the latter case, the bone is described as "the posterior scapular" (cf. *op. cit.*, vol. ii, p. 10).

This artery is endangered in the operation of laryngotomy.

upper surface of the diaphragm are supplied by the internal mammary artery (II) and the external mammary artery (III) on the right and the internal mammary artery (IV) and the external mammary artery (V) on the left. The external mammary artery (V) on the left is a branch supplied to the diaphragm by the internal mammary artery, and the external mammary artery (III) on the right is a branch supplied to the diaphragm by the internal mammary artery.

name is, however, equally applicable to both; and, in fact, the

the vomer, and ends in a small vessel which enters the incisor foramen to communicate with the descending palatine artery" (Quain, *op. cit.*, vol. ii., p. 406). According to Macalister's nomenclature, the *nasopalatine artery* divides into *superior* and *inferior* branches, the latter being that which passes through the incisor foramen. Von Langer and Toldt regard the *arteria nasopalatina* as the terminal branch of the *arteria palatina descendens*, which ascends through the incisor foramen (canal of Stensen) to anastomose with one of the *arteria nasales* previously mentioned (see note <sup>183</sup> below). These are merely two different ways of regarding the same anatomical data.

<sup>186</sup> *Rami Dorsales Linguae* (Ibid.).—The *lingual artery* may supply a single *dorsal artery of the tongue* on either side, or (as here) several *dorsal lingual branches*.

<sup>187</sup> *Internal Carotid Artery* (Ibid.).—Two branches are given off from the second or intra-osseous portion of this vessel; (1) the *tympenic branch* (*ramus caroticotympanicus*), which passes through one of the caroticotympanic canaliculi and anastomoses with the other *tympenic arteries* (see note <sup>185</sup> above); and (2) the *Vidian branch* (not shown in Fig. 1006), which anastomoses with the *Vidian branch* (*arteria canalis pterygoidei Vidiani*) of the internal maxillary artery.

<sup>188</sup> *Arteria Palatina Descendens*, \**Arteria Palatina Major*, et \**Arteria Palatina Minores* (Fig. 1007, p. 619).—The *superior* or *descending palatine artery*, arising in the sphenomaxillary fossa from the third (terminal) portion of the internal maxillary artery (see Fig. 1005, p. 617), sometimes gives off the *Vidian artery*, which may, however, arise separately from the internal maxillary trunk; it also gives small branches which descend in the posterior and external accessory palatine canals to supply the soft palate and the tonsil—these, called by Toldt \**arteria palatina minores*, are left unnamed by Quain and Macalister, but may be termed the \**accessory palatine arteries*; descending in the posterior palatine or palatomaxillary canal, the *superior* or *descending palatine artery* emerges on the inferior surface of the hard palate accompanied by the large palatine nerve, and runs forward in one of the \**palatine grooves*; in this situation its name is unchanged in the English nomenclature; the author, however, now calls it \**arteria palatina major*, the \**great palatine artery*; the vessel terminates, as described in note <sup>185</sup> above, by ascending through Stensen's canal to anastomose with the *nasopalatine artery* or *artery of the septum*.

<sup>189</sup> *Rami Gingivales Inferiores* (Ibid.).—The *inferior gingival branches* are derived partly from the *sublingual artery*, partly, also, from the *submental artery*, and from the *mylohyoid branch* of the *inferior dental (or alveolar) artery*.

<sup>190</sup> *Meningeal Branch of the Vertebral Artery* (Ibid.).—It is to this vessel that the name of *posterior meningeal artery* is commonly applied by English anatomists. The small vessel seen emerging from the jugular foramen, to which the name *arteria meningea posterior* is given by the author, is an offset of the ascending pharyngeal artery. (See also note <sup>176</sup> above.)

<sup>191</sup> *Arcus Ruvinius* (Fig. 1008, p. 620).—"Near the tip of the tongue the two *ranine arteries* communicate by means of a small loop (Krause), but with this exception the right and left arteries do not form other than capillary anastomoses" (Quain, *op. cit.*, vol. ii., p. 396).

<sup>192</sup> *Rami Musculares Arteriae Ophthalmicae* (Fig. 1010, p. 621).—Some of these are named by English anatomists. Quain writes: "Small *muscular* offsets arise at uncertain intervals from the trunk of the *ophthalmic artery*, as well as from the *lacrimal* and *supra-orbital branches*; in addition to these there are two more regular branches, an *external*, which is distributed to the upper

and outer muscles of the orbit, and an *internal*, larger and more constant, to the lower and inner muscles" (*op. cit.*, p. 409). Macalister calls these branches *superior* and *inferior muscular*, respectively, and describes also a special *muscular artery* to the *external rectus*.

<sup>193</sup> *Ramus Orbitalis Arteriae Meningeae Medie* (Var.) (Ibid.).—There is normally a small communicating branch, called by Quain the *orbital branch* of the *middle* or *great meningeal artery*, passing from the trunk of this vessel or from its anterior division through the outer end of the sphenoidal fissure (or through a special aperture in the great wing of the sphenoid bone) to join a branch of the *lacrimal artery*, and the *ramus orbitalis* here figured is a larger homologue of this vessel. Macalister names it the *lacrimal branch* of the *middle meningeal artery*, and in one place (*op. cit.*, p. 582) describes it as supplying the *lacrimal gland*; in another (p. 657), he states that the *lacrimal artery* (*ex arteria ophthalmica*) "receives a large branch through the sphenoidal fissure from the *middle meningeal artery*, this branch varying inversely in size with the *lacrimal artery* itself."

<sup>194</sup> *Arteria Tympanica Superior* (Ibid.).—Usually known in England by the name of the *tympenic branch* of the *middle* or *great meningeal artery*. (See note <sup>183</sup> above.)

<sup>195</sup> *Arteria Cerebelli* (Fig. 1011, p. 622).—Some confusion is liable to arise regarding the nomenclature of the *cerebellar arteries*, and for this reason the use of double names is better avoided, and I adhere to those employed by Macalister. These vessels are three in number, two being offsets of the *basilar artery*, the third being derived from the vertebral: (1) *Arteria cerebelli inferior anterior*, the *anterior cerebellar artery* (Macalister); this arises from the posterior extremity of the *basilar artery*; Quain calls it the *anterior (inferior) cerebellar artery*, Ellis the *anterior cerebellar artery*. (2) *Arteria cerebelli superior*, the *superior cerebellar artery* (Macalister), this arises from the anterior extremity of the *basilar artery*, being commonly described as one of the terminal branches of that vessel; Quain and Ellis also call this the *superior cerebellar artery*. (3) *Arteria cerebelli inferior posterior*, the *posterior cerebellar artery* (Macalister); this arises from the vertebral artery; Quain calls it the *(posterior) inferior cerebellar artery*, Ellis the *inferior cerebellar artery*.

<sup>196</sup> *Operculum* (Fig. 1012, p. 623).—This name is given to the portions of the frontal and parietal lobes lying between the ascending and posterior branches of the fissure of Sylvius, and covering the upper part of the central lobe or Island of Reil. It is sometimes called more fully the *operculum of the insula*; sometimes, also, the *operculum of Burdach*.

<sup>197</sup> *Vena Mediana Collis* (Figs. 1015, 1016, p. 626).—"When both *anterior jugular veins* are absent, or very small, we find in the median line the '*median vein of the neck*, the radicles of which are beneath the chin, and which runs in the superficial fascia towards the *suprasternal notch* (or *fossa jugularis*); in this region it usually bifurcates into right and left branches, which enter the '*jugular venous arch* in the *spatium interaponeuroticum supra-sternale* [*suprasternal space*, or *Burns's space* (see note <sup>172</sup> above)], or the lower part of the *median vein of the neck* may itself form part of the '*jugular venous arch*'" (Von Langer and Toldt, *op. cit.*, p. 542). Quain states that the *anterior jugular vein* varies greatly in size, and that the right and left veins may sometimes be united into a single median vessel for a part of their length. Macalister uses the term *vena mediana collis* as a synonym for the *anterior jugular vein*.

<sup>198</sup> (Fig. 1015, p. 626).—Called by Macalister *nervus descendens cervicis*. This branch is, however, still very commonly known by the old name of *descendens noni*, the *hypoglossal nerve*, the *eleventh*



internal

closed, but within the parameters of the social and cultural function of the novel, the novel is a form of writing that is "in the process of anatomy,"

vertebral foramina, pedicles, laminae, and transverse processes.

portal and lumbar veins, and the lateral sacral vein

of the carotid sheath anterior to the trachea, and between the suprahyoid layer and the suprasternal layer.

omenclature, which is that usually accepted in England, the *subscapular artery* gives off a large *dorsal branch*, and its down-  
smaller than the dorsal branch.

follows the Continental usage in terming it the *thoracodorsalis artery*, but by most English anatomists it is still called *subscapular artery* in this part of its course; it terminates in *muscular branches* to the *latissimus dorsi*, *serratus magnus*, *teres major*, and *teres minor* muscles. III. *Branches to the Internal Wall of the Axilla*: 4. *Arteria thoracalis lateralis*, the *long thoracic* (or *external mammary artery*), which gives *muscular branches* to the *serratus magnus*, *pectoralis major*, and *pectoralis minor* muscle, and *rami mammarii*, *external mammary branches* (see note <sup>204</sup> above). IV. *Branches to the External Wall of the Axilla*: 5. *Arteria circumflexa humeri anterior*, the *anterior circumflex artery* (of the arm). 6. *Arteria circumflexa humeri posterior*, the *posterior circumflex artery* (of the arm), which runs backwards through the \**external axillary space* (see Part III., p. 312, Fig. 589, and note <sup>1</sup> to same page) or *quadrilateral space* (Macalister), and gives numerous offshoots, named by Macalister as follows: *Ascending branch*, to the *teres minor* muscle; *descending branch*, to the long head of the *triceps*; *nutrient branch*, to the great tuberosity of the humerus; *posterior articular artery*, to the shoulder-joint; *acromial branch*, to the *rete acromiale* (see note <sup>170</sup> above); and an *anastomotic branch* to the *superior profunda branch* of the *brachial artery*. Fifth Group. *Branches not enumerated by Von Langer and Toldt*: 7. The *alar thoracic artery* to the lymphatic glands and fatty tissue of the axilla; this is a very variable branch, and may arise (a) direct from the *axillary trunk*, (b) from the *long thoracic artery*, (c) from the *thoracic axis* (*acromiothoracic artery*). 8. In females there is occasionally an independent *external mammary artery*, arising from the *axillary trunk* below the origin of the *posterior circumflex artery*. Sixth Group. 9. *Rami subscapulares*, the *short subscapular arteries*, must also be mentioned, usually two in number, small vessels passing backwards from the *axillary trunk* to the *subscapularis* muscle.

<sup>207</sup> *Parts of the Axillary Artery* (Ibid.).—By Von Langer and Toldt, as by English anatomists, the axillary artery is divided into three parts, but the limits of these are not exactly identical in the Continental and the English description. As already mentioned (see note <sup>205</sup> above), according to Von Langer and Toldt, the subclavian artery becomes the axillary at the lower border of the subclavius muscle, but according to English anatomists at the outer border of the first rib. It is obvious that the English boundary is more precise, inasmuch as the position of the subclavius muscle varies with the varying elevation of the shoulder. The *first* part of the axillary artery extends from its commencement to the upper border of the *pectoralis minor* muscle. The *second* part of the artery lies beneath (behind) the *pectoralis minor* muscle. The *third* part of the vessel extends from the lower border of the *pectoralis minor* muscle to the termination of the vessel. In this respect, again, there is a difference between the Continental and the English usage, for according to the former, the axillary artery becomes the *brachial* opposite the lower (outer) border of the *pectoralis major* muscle; but according to the latter, opposite the lower (outer) border of the *teres major* muscle. Thus, the third part of the axillary artery, as the term is understood in England, is nearly twice as long as the third part of the vessel as described by Von Langer and Toldt.

<sup>208</sup> *Arteria Cervicalis Superficialis* (Ibid.).—"The *superficial cervical artery* is distributed to the superficial structures of the (greater) supraclavicular fossa, to the trapezius, levator anguli scapulae, rhomboideus major, serratus posticus posterior, and splenius capitis muscles. Its size and the area it supplies are exceedingly variable; it may entirely replace the *transverse cervical artery* (*arteria transversa colli*), or, conversely, be entirely replaced by that vessel. Normally it is one of the principal branches of the

thyroid axis" (Von Langer and Toldt, *op. cit.*, p. 512). Quain's use of the term *superficial cervical artery* is explained in notes <sup>131</sup>, <sup>132</sup>, and <sup>172</sup> above.

<sup>209</sup> *The Branches of the Brachial Artery* (Fig. 1019, p. 630).—1. *Arteria profunda brachii*, the *superior profunda artery* (of the arm), which gives the following offshoots: (a) *Ramus deltoideus*, the communicating branch (Macalister) or *deltoid branch* (Quain), which anastomoses beneath the deltoid muscle with branches of the *posterior circumflex artery*; (b) *arteria nutritiva humeri*, the *nutritious* (Macalister) or *medullary branch* (Quain); (c) *arteria collateralis media*, the *muscular branch* to the inner head of the *triceps* muscle; (d) *arteria collateralis radialis* (regarded in England as the terminal portion of the *superior profunda artery* itself), the *anterior terminal branch* of which passes with the *musculospiral nerve* through the external intermuscular septum, and anastomoses with the *radial* and *recurrent artery*, while the *posterior terminal branch* passes along the back of the external intermuscular septum, and ends in the *rete olecrani*, anastomosing there with the *inferior profunda*, *anastomotica magna*, *posterior ulnar recurrent*, and *interosseous recurrent arteries*. There are, further, (e) the *muscular branch* to the long head of the *triceps* muscle, (f) a cutaneous branch with the inner cutaneous branch of the *musculospiral nerve*. 2. *Arteria collateralis ulnaris superior*, the *inferior profunda artery*, which supplies the inner head of the *triceps*, and ends in the *rete olecrani* already described. 3. *Arteria collateralis ulnaris inferior*, the *anastomotica branch* (*anastomotica magna*), which runs in the inner bicipital furrow, perforates the internal intermuscular septum, and joins the *rete olecrani*; it gives an *anterior branch* which descends between the *brachialis anticus* and *pronator radii teres* muscles in front of the internal condyle to anastomose with the *anterior ulnar recurrent artery*. 4. In addition to the *medullary* or *nutritious* branch of the *superior profunda*, there is another and larger vessel supplied to the humerus called the *chief medullary artery*, which usually arises in common with the *upper muscular branch* to the *brachialis anticus* muscle; the foramen for the chief artery is just below the insertion of the *coracobrachialis* muscle, that for the *nutrient branch* of the *superior profunda* is higher up, near the top of the spiral groove. 5. Small *muscular branches* are furnished by the *brachial artery* during its course, and are stated by Macalister to be usually eight in number. 6. According to Macalister, a *vas aberrans*, arising close to or in common with the *superior profunda artery*, descending over the median nerve, supplying the biceps, and ending by joining the *radial* (or less commonly the *ulnar*) artery, is usually present, but often so small as to escape injection; other authorities speak of its presence as exceptional. When large it may replace and simulate the *brachial artery*, which then appears to be superficial to the median nerve. If moderately large it may replace the ordinary origin of the *radial artery* (rarely that of the *ulnar artery*); we thus have the condition, often met with, called the high bifurcation of the *brachial artery*. "A very interesting variety in the origin of the branches of the *brachial artery* is that in which the *superior profunda artery*, the *inferior profunda artery*, and the *anastomotica magna artery* all arise by a common stem, from which the *circumflex arteries* and the *subscapular artery* are also derived. In such cases, the axillary artery, as it emerges from the axilla, is seen to divide into two trunks of equal size, one of which runs as far as the elbow without giving off any branches of importance, whilst the other supplies the structures of the shoulder and the other arm. This condition resembles that normally met with in the distribution of the *femoral artery*" (Von Langer and Toldt, *op. cit.*, p. 516).



<sup>222</sup> (Fig. 1031, p. 639.) It will be noticed that the author numbers the *arteria metacarpea dorsalis* according to the number of the interosseous space in which they lie. In Quain's nomenclature, however, the *arteria metacarpea dorsalis prima*, being very small, is ignored; and thus the first dorsal interosseous artery of Quain (*metacarpal branch of the radial artery*, according to Macalister) corresponds to the *arteria metacarpea dorsalis secunda* of the author. The Continental enumeration of these vessels is much to be preferred. See also note <sup>220</sup> above.

<sup>223</sup> *Femoral Artery* (Fig. 1033, p. 641).—The portion of this vessel above the origin of the *profunda* is often distinguished as the *common femoral*, that below the origin of the *profunda* as the *superficial femoral artery*.

<sup>224</sup> *Internal Circumflex Artery of the Thigh* (Ibid., p. 641).—According to Von Langer and Toldt's description (*op. cit.*, p. 525), the *arteria circumflexa femoris medialis* divides almost immediately after its origin from the *profunda* into a *ramus superficialis*, distributed to the muscles of Scarpa's space, and a much larger *ramus profundus*, which passes backwards between the pectineus and iliopsoas muscles above the small trochanter to the back of the neck of the femur and supplies the *ramus acetabuli* to the hip-joint. According to the description given by Quain, the *ramus superficialis* corresponds to unnamed muscular branches, while the *ramus profundus* is the continuation of the *arteria circumflexa* itself, arrived at the back of the femur it supplies an *articular branch*, the author's *ramus acetabuli*, the development of which is inversely proportional to that of the *arteria circumflexa*; the *arteria circumflexa*, the internal circumflex finally divides into *ascending* and *transverse branches*, the former following the tendon of the obturator externus muscle to the digital or trochanteric fossa, and the latter ending in the *crucial anastomosis* (see note <sup>220</sup> below).

<sup>225</sup> *Re. Patella* (Ibid.).—The *patellar rete* is that portion of the *rete articularis genu*, the "articular rete of the knee," which lies immediately in front of the patella. The term *patellar rete* is used by Macalister to denote the whole of the articular network of the knee; but Toldt limits the application of *rete patellae* as above defined, and the latter's usage is to be preferred, on the score of accuracy. For an account of the *articular rete of the knee* as a whole see note <sup>220</sup> below.

<sup>226</sup> *Branches of the Femoral Artery in the Lower Part of Hunter's Canal* (Fig. 1034, p. 642).—The author's nomenclature of these differs from that usual in England. "The branches of the femoral artery for the region of the knee-joint often arise by a common trunk, the *arteria genu suprema*. This springs from the femoral artery just above the opening in the adductor magnus muscle, and runs down towards the capsule of the knee-joint in the substance of the vastus internus muscle near the common extensor tendon. It gives *rami musculares* to the vastus internus; a *ramus saphenus* which, descending beside the internal saphenus nerve is distributed to the integument, and finally *rami articularis genu*, which contribute to the *rete articularis genu* (see note <sup>220</sup> below). Often, however, the greater number of the *rami musculares* and the *ramus saphenus* are supplied by a separate branch of the femoral artery, which arises from that trunk somewhat higher up in Hunter's canal" (Von Langer and Toldt, *op. cit.*, pp. 525, 526). According to Quain's description, several *muscular branches* are supplied by the femoral artery in Hunter's canal, the lowermost of which, constant, and of considerable size (sometimes derived from the upper part of the popliteal artery), passes outwards across the back of the femur, perforating the short head of the biceps and the external intermuscular septum, to end in the crureus muscle. The *anastomotic artery* arises from the femoral a little above the opening in the adductor magnus,

and divides almost immediately into two branches (which are in many cases derived separately from the femoral trunk). The *superficial branch* runs down with the internal saphenus nerve; the *deep branch* courses along the front of the tendon of the adductor magnus muscle to the internal condyle of the femur. It supplies *articular branches* to the *rete articularis genu*. From these descriptions it will be apparent that the *anastomotic artery* is identical with the author's *arteria genu suprema*, and the *superficial branch* of that vessel with the author's *ramus saphenus*.

<sup>227</sup> *\*Rete Articularis Genu* (Ibid.).—The "articular rete of the knee" is an arterial network over the front and sides of the knee-joint. It consists of two layers: a *superficial*, with wide meshes and very minute constituent vessels, lying between the skin and the deep fascia; and a *deep*, with finer meshes and larger constituent vessels, actually in contact with the bones. The *patellar rete* is that portion of the network situate immediately in front of the patella, but the term is by English anatomists usually applied (inaccurately) to the network as a whole. The vessels supplying the rete are six in number, viz., the four lateral *articular branches* of the popliteal, the *anastomotic branch* of the femoral, and the *recurrent branch* of the anterior tibial artery.

<sup>228</sup> *Hunter's Canal* (Ibid.).—It is to be noted that the author uses the term *Hunter's canal* in a sense different from that attached to it by English anatomists. We find the following description in Von Langer and Toldt's "Anatomy," 7th ed., p. 263: "The *fossa iliopectinea* (Scarpa's triangle) . . . passes below into a groove, bounded internally by the adductor muscles and externally by the vastus internus muscle, and extending downwards along the long axis of these muscles. Already at the upper part of the middle third of the thigh, this groove is roofed by the sartorius muscle, and in addition, from about the middle of the thigh downwards, it is covered by a strong tendinous membrane, which stretches across from the commencement of the tendon of the adductor magnus muscle to the vastus internus muscle. Thus the groove is converted into a closed canal, *canalis adductorius Hunteri* (Hunter's canal)." If this description leaves the point still undecided, the description of Fig. 1034 shows clearly that the fascial layer there figured covering the lower part of the femoral artery is the roof of Hunter's canal, the upper aperture of which is in the middle of the thigh. In England, however, the sartorius muscle is regarded as the roof of Hunter's canal, and that canal extends from the point at which the muscle comes to lie in front of the artery, i.e., the apex of Scarpa's triangle, to the opening in the adductor magnus muscle. And while it is true that the accessory fascial roof of Hunter's canal is thicker and stronger below than above the middle of the thigh, that fascial roof exists wherever the femoral artery is covered by the sartorius muscle, and the well-defined upper margin of the fascia shown in Fig. 1034 is the product of dissection.

<sup>229</sup> *Gluteal Artery* (Fig. 1038, p. 646).—By English anatomists this vessel is described as dividing just after it emerges from the pelvis into a *superficial*, smaller, part, and a *deep*, larger, part; the latter, again, divides into *superior* and *inferior branches*. In Toldt's nomenclature the superficial part is called the *muscular branch* to the gluteus maximus muscle, whilst it is the continuation of the trunk of the *arteria circumflexa profunda* which divides into a *ramus superior* and a *ramus inferior*.

<sup>230</sup> *Iliopsoas, Re. and Canal Adductor* (Ibid.).—The *anastomotic branch* of the sciatic artery (seen in Fig. 1038 running downwards and outwards along the lower border of the pyriformis muscle), the *ascending branch* of the first or superior perforating artery, the *transverse branch* of the internal circumflex artery, and





notes<sup>239</sup> and<sup>240</sup> above. The *anterior perforating arteries* are small and inconstant vessels connecting the anterior extremities of the *dorsal calcaneal arteries* with the *plantar digital arteries* adjacent to the terminal bifurcation of these vessels. The author calls them *rami anastomosei arteriarum calcaneorum dorsorum cum arteriis digitalibus plantaribus*.

<sup>239</sup> *Cutaneous Rete* (Fig. 1044, p. 652).—The arterial network over the back and the under surface of the heel communicates above with the *external and internal malleolar retia* (see note<sup>237</sup> above), and in front with the *plantar rete* (see note<sup>240</sup> below). It is supplied by the *external and the internal calcaneal branches*, the former being derived from the *peroneal artery*, and the latter from the *posterior tibial artery* (Von Langer and Toldt), from the *external plantar artery* (Quain), or from both these vessels (Macalister).

<sup>240</sup> *Plantar Rete* (Ibid.).—The fine-meshed arterial subcutaneous network over the sole of the foot communicates freely with the *calcaneal and malleolar retia* and with the *dorsal rete of the foot*, and in addition to the blood received from these sources is reinforced by numerous unnamed cutaneous offsets of the branches of the plantar arteries, which reach the rete by perforating the plantar fascia.

<sup>241</sup> (Fig. 1045, p. 653.) The fascia covering the popliteus muscle is reinforced by, and, indeed, to a large extent derived from, a downward expansion of the tendon of insertion of the semimembranosus muscle.

<sup>242</sup> *Lower Limit of the Popliteal Artery* (Ibid.).—There is some inconsistency in the account given both by Quain and by Macalister of the lower limit and point of division of the popliteal artery. According to the former author, "the popliteal artery . . . reaches from the opening in the adductor magnus to the lower border of the popliteus muscle, where it divides into the anterior and posterior tibial arteries." But in describing the relations of the artery Quain states that "its termination is beneath the upper margin of the soleus muscle" (*op. cit.*, vol. ii., part ii., p. 493). Macalister also states that the artery divides "at the lower border of the popliteus muscle" (*op. cit.*, p. 499); and a few pages later, in describing the termination of the artery, he tells us that it is exposed by removing the gastrocnemius and the soleus muscles (p. 509). Now, these statements are irreconcilable, for the *popliteal or oblique line of the tibia* (see Fig. 334, p. 136, in Part I.), which gives origin to the soleus muscle, at the same time marks the lower limit of the insertion of the popliteus muscle. Hence these muscles do not overlap, as is well shown by Fig. 612, p. 363, in Part III., and if the popliteal artery really divided at the lower border of the popliteus muscle, the soleus muscle could not possibly lie behind its termination. The description given by Von Langer and Toldt of the ending of this artery is at once more accurate and more consistent than that of the English anatomists just quoted. The German authors ("Anatomy," 7th ed., p. 527) describe the vessel as passing down behind the popliteus muscle to enter what they call the *\*popliteal canal* (see note<sup>244</sup> above)—i.e., the space beneath the tendon of the *adductor magnus* (Fig. 334, p. 136), and immediately thereafter dividing into anterior and posterior tibial arteries (see also note<sup>240</sup> below). The entrance to the "popliteal canal" is also shown in Fig. 612. In not a few instances, indeed, the popliteal artery divides, as described by Quain and Macalister, at the lower border of the popliteus muscle, and in such cases, as stated in note<sup>243</sup> to p. 363, Part III., it is the *posterior tibial* vessels and nerve that enter the "popliteal canal"; but this high division of the artery precludes the possibility of its termination lying beneath the upper part of the soleus muscle.

<sup>243</sup> *Soleus Muscle* (Fig. 1046, p. 654).—It is somewhat inconsistent of the author to speak of the *tibial head (caput)* and the *fibular head* of the soleus muscle, inasmuch as he gives the name of *triceps sura* to the gastrocnemius and soleus, considered as a single three-headed muscle (see Figs. 617 and 618, pp. 368 and 369, in Part III.), of which two heads, the inner and outer head of the gastrocnemius, are superficial and attached to the femur, whilst the third head, the soleus, is deep, and attached to the bones of the leg. Moreover, the fibres from the fibula, those from the tendinous arch, and those from the tibia, form a continuous muscular mass, which is not separable into distinct heads (see Fig. 612, p. 363, in Part III.). Quain, however, falls into the same error when he writes: "The tibial head of the soleus is almost peculiar to man: among the lower animals it occurs, of small size, only in the gorilla, and sometimes in the chimpanzee" (*op. cit.*, vol. ii., part ii., p. 264). It should, of course, read "the tibial origin of the soleus," etc.

<sup>244</sup> *Communicating Branches between the Anterior Tibial and Peroneal Arteries* (Ibid.).—Quain writes (*op. cit.*, vol. ii., part ii., pp. 496, 497): "A communicating branch passes transversely beneath the flexor longus hallucis muscle, between the posterior tibial and peroneal arteries, about an inch above the ankle-joint. A second loop of communication between these vessels is sometimes present, lying in the fat beneath the tendo Achillis." It is this second loop which is seen in Fig. 1046, just above the severed extremity of the tendo Achillis; and in Fig. 1047, in addition to both the vessels above described, we see a large communicating branch two or three inches above the ankle-joint. In Von Langer and Toldt's "Anatomy" (7th ed., p. 528) the principal communicating branch between these vessels is called *ramus anastomoseus*.

<sup>245</sup> *Terminal Branches of the Anterior Tibial Artery* (Fig. 1047, p. 655).—Quain and Macalister agree in calling this small vessel the *superior fibular branch*; but as there is no *inferior fibular branch*, the name used in the text is to be preferred.

<sup>246</sup> *Division of the Popliteal Artery* (Ibid.).—As explained in note<sup>242</sup> above, Von Langer and Toldt describe the popliteal artery as entering the "popliteal canal," and "immediately thereafter dividing into anterior and posterior tibial arteries." It is necessary to add that the German authors regard the *anterior tibial artery* as a branch of the popliteal artery, which latter vessel, in their view, terminates nearly an inch below the origin of the anterior tibial by division into the *posterior tibial and peroneal arteries*. According to the description usually given by English anatomists, on the other hand, the terminal branches of the *popliteal artery* are the *anterior and posterior tibial arteries*, while the *peroneal artery* is regarded as a branch of the *posterior tibial artery*. The difference is solely one of terminology.—I may, in conclusion, mention an actual but somewhat rare variety in which the popliteal artery divides into three terminal branches: the anterior tibial, posterior tibial, and peroneal arteries.

<sup>247</sup> *Branches of Internal Plantar Artery* (Fig. 1048, p. 656).—According to Von Langer and Toldt (*op. cit.*, p. 529), this vessel divides into a *ramus superficialis* (*superficial branch*) which supplies the abductor hallucis muscle, and a *ramus profundus* (*deep branch*) which sinks deeply into the inner plantar furrow (the interval between the abductor of the great toe and the short flexor of the toes). Quain (*op. cit.*, vol. ii., part ii., p. 498) enumerates the branches of the internal plantar artery as follows: (a) Small communicating branches to the digital arteries of the three inner clefts; (b) muscular branches; (c) cutaneous branches in the inner plantar furrow; (d) cutaneous branches to the inner border of the foot; (e) deep offsets to the bones and joints of the foot;

nomenclature of the digital arteries (Table 1).

In conclusion, a study of the anatomy of the ankle joint is necessary to find a

<sup>202</sup> (Ibid.) Concerning the author's application of the term *arteria transversa colli* (transverse cervical artery), see Appendix, notes 134, 133, 172 and <sup>200</sup>; similar considerations apply to the use of the term *vena transversa colli* (transverse cervical vein). Macalister gives *posterior scapular* as an alternative name for these vessels.

<sup>203</sup> \**Posterior Internal Vertebral Venous Plexus* (Fig. 1064, p. 667).—"Within the spinal canal and on the back of the theca vertebralis there is a close plexus of veins, the *postero-internal plexus*, whose main trunks are longitudinal on the inside of the articular masses" (Macalister, *op. cit.*, p. 260). "The *posterior longitudinal spinal veins* . . . two in number . . . are often much broken up in parts of their course, and they communicate with one another by numerous cross-branches on the anterior surface of the arches of the vertebrae" (Quain, *op. cit.*, vol. ii., part ii., p. 533). Here we have two different modes of regarding the same anatomical data. See also note <sup>220</sup> above.

<sup>204</sup> *Lateral and Sigmoid Sinuses* (Ibid.).—The common English usage is to extend the meaning of the term *lateral sinus* so as to include that sinus which (following Macalister as well as Toldt) is here distinguished as the *sigmoid sinus*. Thus, according to Quain and the majority of English anatomists, the *lateral sinus* extends from the internal occipital protuberance to the jugular foramen. In this work, however, it is regarded as extending from the internal occipital protuberance to the point where the channel for the sinus passes from the cerebral surface of the parietal to the cerebral surface of the temporal bone. At this point the lateral sinuses "in their archaic fetal condition communicated through the post-gleroid foramen with the primitive external jugular vein, but this connexion early diminishes, and is ultimately represented only in rudiment by the mastoid vein; an original small channel of communication from the lateral sinus to the posterior lacerate foramen becomes commensurately dilated, and appears in the adult as its continuation, the *sigmoid sinus*" (Macalister, *op. cit.*, p. 533).

<sup>205</sup> \**Venous Retia of the Intervertebral Foramen* (Ibid.).—Writing of the *posterior longitudinal spinal veins* and the *posterior internal vertebral venous plexus* (see note <sup>203</sup> above), Quain states (*op. cit.*, vol. ii., part ii., p. 533): "From the plexus . . . offsets pass outwards to the intervertebral foramina, where they join the similar branches given off by the anterior longitudinal veins, and form a plexus around the issuing nerve;" but this author does not make use of the name given above. Macalister merely says that through each intervertebral foramen there emerges an outflowing *ramus spinalis* [i.e., the *\*intervertebral vein*] to join the *plexus dorsalis* [i.e., the *\*posterior external vertebral venous plexus*—see note <sup>200</sup> above].

<sup>206</sup> *Torcular Herophili, or Confluence of the Sinuses* (Ibid.).—Properly this name should be applied only to a somewhat rare arrangement of the sinuses, when a true *confluent sinuum* is exhibited at the common meeting-point of the superior longitudinal sinus, the straight sinus, the occipital sinus, and the right and left lateral sinuses. The usual arrangement is for the superior longitudinal sinus to be continued into the right lateral sinus, a dilatation marking the angle of union, this dilatation receiving the occipital sinus, and being conventionally called the *torcular Herophili*; the straight sinus turns to the left into the left lateral sinus, and the right and left lateral sinuses are commonly connected at their origin by a larger or smaller communicating vein. Sometimes this arrangement is reversed, the superior longitudinal sinus being continued into the left, the straight sinus into the right lateral sinus. (See Fig. 1234, p. 804, in Part VI.) The lateral sinus that receives the superior

longitudinal sinus is larger than that which receives the straight sinus. Something approaching a true *confluence of the sinuses* is seen in Fig. 1064, in which the superior longitudinal sinus divides, a larger right division being continuous with the right lateral sinus, and a smaller left division being continuous with the left lateral sinus. The termination of the straight sinus in this specimen is not apparent in the figure, but the occipital sinus passes to the commencement of the right lateral sinus.

<sup>207</sup> \**Anterior Internal Vertebral Venous Plexus* (Fig. 1065, p. 668).—The *postero-internal plexus*, says Macalister (*op. cit.*, p. 260), is connected by transverse branches "with the still larger *anterior internal plexus*, which lies on the backs of the bodies of the vertebrae. The main stems of this latter are two long veins which pass from end to end of the vertebral canal on the roots of the pedicles of the vertebrae. Across the back of every body these are joined by a cross-branch. Each of these anterior transverse branches receives the *basivertebral vein* from the cancelli of the vertebral body." Quain gives no name to this plexus, but states (*op. cit.*, vol. ii., part ii., p. 533) that "the *anterior longitudinal spinal veins* are two large plexiform vessels which extend the whole length of the spinal canal, lying behind the bodies of the vertebrae, one along each edge of the posterior common ligament." Young (U.S.) calls this plexus the *anterior intraspinal plexus*. (See also note <sup>200</sup> above.)

<sup>208</sup> *Basivertebral Veins* (Ibid.).—Quain calls these veins the *internal veins of the bodies of the vertebrae*, which is cumbersome. The name *basivertebral veins* is current, and sufficiently distinctive. Young (U.S.) calls them *vena basis vertebrae*, of which the name used in the text is a convenient modification. For their connexion with the *\*anterior internal vertebral plexus*, see note <sup>207</sup> above.

<sup>209</sup> \**Venous Retia of the Vertebrae* (Ibid.).—"The *plexus venosi vertebrales interni* are mainly constituted by individual circularly-disposed extrathecal networks, the *retia venosa vertebrae*, which, in each vertebra, are attached in front to the posterior surface of the vertebral body, and are in apposition behind with the neural arch. There are, therefore, as many vertebral venous retia as there are vertebrae in the spinal column. Their series is completed above by a plexiform vascular ring surrounding the foramen magnum" (see notes <sup>202</sup> and <sup>231</sup> above).—Von Langer and Toldt, *op. cit.*, p. 540.

<sup>210</sup> \**Venous Plexus of the Nipple* (*Circulus Venosus of Haller*) (Fig. 1068, p. 671).—Von Langer and Toldt, after stating that the veins of the breast correspond in distribution and nomenclature with the arteries of that organ, write (*op. cit.*, p. 411): "Noteworthy is the *plexus venosus mamillae* in the region of the areola, which is nothing more than a ring-shaped anastomotic chain of small subcutaneous veins surrounding the nipple (mamilla)." The term *\*venous plexus of the nipple* is not used by Quain or Macalister, but the former authority remarks (*op. cit.*, vol. iii., part iv., p. 290) that "Haller described a sort of anastomotic venous circle surrounding the base of the nipple as the *circulus venosus*"; and the latter, describing the blood-supply of the breast, writes (*op. cit.*, p. 264): "Some of the veins are deep, and accompany the arteries; others form a superficial circle of anastomosis in the areola, and end in the superior thoracic vein."

<sup>211</sup> \**Circulo-axillary and Thoracic-epigastric Veins* (Ibid.).—"Of considerable importance are the anastomotic connexions between the axillary vein and the intercostal veins, on the one hand, and between the axillary vein and the subcutaneous venous network of the anterior abdominal wall, on the other. The former is affected by a number of venous radicles, known as the *\*vena*





considerations apply to his use of the term *superficial cervical vein*.

<sup>286</sup> *Ranine Vein* (Fig. 1078, p. 683).—"The lingual artery is accompanied by two small *vena comites*, but the largest vein of the tongue is the *ranine*, which lies external to the artery of the same name, and, after being joined by *sublingual branches*, passes backwards over the hyoglossus muscle with the hypoglossal nerve. These veins end in the internal jugular" (Ellis, "Demonstrations of Anatomy," 10th ed., p. 97). The *ranine vein*, called by the author, from its course adjacent to the hypoglossal nerve, *vena comitans nervi hyoglossi*, thus returns the greater part of the blood carried to the tongue by the *lingual artery* and its continuation the *ranine artery* (called by the author *arteria profunda linguae*); but the vein and the nerve lie superficial to, while the artery lies beneath, the hyoglossus muscle.

<sup>287</sup> *Veins of the Temporomandibular Articulation* (Ibid.).—Among the tributaries of the *temporal vein*, Quain mentions "branches from a plexus which surrounds the articulation of the lower jaw, and into which one or two small veins issuing from the tympanum by the fissure of Glaser pour their contents," but he does not give these vessels any distinctive name.

<sup>288</sup> *Submaxillary Vein* (Fig. 1079, p. 684).—The name of *fossa submaxillaris* is given by the author to the space between the superficial and deep layers of the deep cervical fascia, in which the submaxillary gland lies, bounded above by the lower margin of the mandible, below by the anterior belly of the digastric muscle, and behind by the stylomaxillary ligament. In Quain's terminology this region is the *submaxillary triangle*; in Macalister, it is the *anterior triangle of the deep cervical fascia*.

<sup>289</sup> *Supraclavicular Fossa* (Ibid.).—In the terminology of English anatomists there is one *supraclavicular fossa* only, viz., the lower part of the posterior triangle of the neck. This, however, is called by the author \**fossa supraclavicularis major*, the *superior supraclavicular fossa*; while he gives the name of \**fossa supraclavicularis minor*, the *lesser supraclavicular fossa*, to the depression above the sternal extremity of the clavicle which corresponds to the interspace between the two heads of the sternocleidomastoid muscle.

<sup>290</sup> *Basilar Venous Plexus* (*Basilar Sinus*, Fig. 1080, p. 685).—This is sometimes also called the *transverse sinus*, but the name is better avoided, since the occipital portion of the *lateral sinus* is known in the Continental nomenclature as *sinus transversus* (see note <sup>294</sup> above). According to Von Langer and Toldt, the *basilar venous plexus* is to be regarded as an upward extension of the \**anterior internal vertebral venous plexus* (see note <sup>307</sup> above), with which it communicates through the foramen magnum. On each side it opens into the *inferior petrosal sinus*. The *basilar venous plexus* must be carefully distinguished from the *basilar or basal vein*, *vena basalis* (Rosenthal). See Fig. 1086, p. 691, and note <sup>291</sup> below.

<sup>291</sup> *Rete Canalis Hyfogllossi and Emissarium Canalis Hyfogllossi* (Ibid.).—According to Quain (*op. cit.*, vol. ii., part ii., p. 526), "A venous ring surrounds the hypoglossal nerve in the anterior condylar foramen, and communicates internally with the occipital sinus and intraspinal veins, externally with the vertebral vein and the plexus on the front of the spine." Von Langer and Toldt describe as normal the existence of a venous network round the hypoglossal nerve, known as the \**venous rete of the anterior condylar foramen*, and shown in the right side of Fig. 1080; a variety is the existence of a single, comparatively large, emissary vein in this situation, the \**venous vein of the anterior condylar foramen*, called by Macalister the *arterio-venous vein*, shown in the left side of Fig. 1080. See also note <sup>292</sup> above.

<sup>292</sup> \**Venous Rete of the Foramen Ovale* (Fig. 1082, p. 687).—This name is not used by Quain or Macalister, but the former, in his description of the emissary veins, writes (vol. ii., part ii., p. 526): "One or two considerable veins descend from the cavernous sinus through the foramen ovale, as well as small ones through the fibrous tissue in the foramen lacerum, to the pterygoid and pharyngeal plexuses. There is frequently another vein passing through the foramen of Vesalius."

<sup>293</sup> *Lacunae Laterales* (Fig. 1083, p. 688).—"Communicating with the superior longitudinal sinus from its anterior end as far back as the beginning of the occipital region are a number of diverticula, from 0.5 to 3 cm. long, which form a series of venous lacunae (*lacunae laterales* of Key and Retzius) receiving the independent meningeal veins, and some veins from the diploe, and are invaginated by Pacchionian granulations. These venous lacunae are not entirely confined to the region of the superior sinus, but some may occur in the neighbourhood of other sinuses, especially the lateral and straight sinus" (Quain, *op. cit.*, vol. iii., part i., p. 184).

<sup>294</sup> (Fig. 1084, p. 689). The *superior thyroid vein* sometimes opens directly into the *internal jugular vein*, sometimes, as in the specimen shown in Fig. 1084, into the *superficial vein*. Regarding the last-named vein, see note <sup>295</sup> above.

<sup>295</sup> *Palatine Veins* (Ibid.).—Quain describes two palatine veins, a *superior palatine vein*, which enters the *foramen palatinum majus*, and an *inferior palatine vein*, which returns the blood from a plexus surrounding the tonsil and from the soft palate, runs downwards beside the pharynx, and opens usually into the *basal vein* near to its proximal extremity. The *inferior palatine vein* of Quain is the vein called *vena palatina* in the author's terminology. The *sphenopalatine vein* (the companion vein of the nasal or sphenopalatine artery), like the superior palatine vein, joins the pterygoid venous plexus.

<sup>296</sup> *Arachnoidal Villi or Pacchionian Bodies* (Fig. 1085, p. 690).—The nature of these bodies having long remained uncertain, they are variously known as *Pacchionian bodies* (*corpora Pacchionii*), *Pacchionian glands* (*glandulae Pacchionii*), and *Pacchionian granulations* (*granulationes Pacchionii*). Luschka, however, has shown conclusively that they are really enlarged *arachnoidal villi*.

<sup>297</sup> *Transverse Basal Vein* (*Transverse Retinal Vein*, Fig. 1086, p. 691). This vein, which winds backward round the crus cerebri to penetrate the *transverse foramen* and before uniting with its fellow, forms an anastomotic communication between that vein and the small veins of the base of the brain, and is formed by the confluence of some of these latter, viz., the *anterior cerebral vein*, the *deep Sylvian vein*, and the *inferior striate veins*. It must not be confused with the *transverse sinus* or *basal sinus*, which is shown in Fig. 1080, p. 685, and described in note <sup>299</sup> above.

<sup>298</sup> *Veins of the Spinal Cord* (Ibid.).—Both Quain and Macalister speak generally of the *veins of the spinal cord* without any attempt at further precision in their nomenclature. According to Von Langer and Toldt (*op. cit.*, p. 599), "the veins of the spinal cord are arranged in two sets: a *superficial set*, the *venae spinales externae* (the *external spinal veins*), which, like the arteries, run on the anterior and posterior surfaces, respectively, of the spinal cord: *venae spinales externae anteriores et posteriores* (anterior and posterior external spinal veins); and a *deep set*, the *venae spinales internae* (the *internal spinal veins*), which are situate within the substance of the spinal cord in the neighbourhood of the central canal. The two sets communicate by horizontal branches; and other horizontal branches, running along the roots of the spinal nerves, connect the *external spinal veins* with the *internal vertebral venous plexuses*. (See note <sup>300</sup> above.)



the *profunda*, which perforates the adductor magnus muscle in series with the branches just mentioned, constitutes the *fourth perforating artery*. In the specimen shown in Fig. 1099, however, there are apparently *three* perforating arteries only, the terminal portion of the *deep femoral* or *profunda artery* constituting the *third* of the series. (This is the arrangement described as normal by Von Langer and Toldt.)

<sup>313</sup> \**Femoropopliteal Vein* (Fig. 1102, p. 708).—"As the *external* or *short saphenous vein*, enters the popliteal space, it is joined by an anastomotic cutaneous vein from the back of the thigh, \**vena femoropoplitea*, which runs beside the small sciatic nerve for some distance, and communicates with the lowest *perforating vein*; finally the *external saphenous vein* enters the *popliteal vein*. Not infrequently, however, the \**femoropopliteal vein* forms the true upward continuation of the *external saphenous vein*, so that the latter is connected with the popliteal vein only by a relatively small communicating branch, while it terminates in the *deep femoral* or *profunda vein* through the intermediation of the lowest *perforating vein*" (Von Langer and Toldt, *op. cit.*, pp. 552, 553). This variety is described by Quain (*op. cit.*, vol. ii., part ii., p. 538), but the name \**femoropopliteal vein* is not used by this author. Another fairly common variety is an enlargement of the communicating branch between the *external* and the *internal saphenous veins*, so that the former vein empties itself chiefly or entirely into the latter.

<sup>314</sup> *Lumbar and Aortic Lymphatic Glands and Plexuses* (Fig. 1112, p. 718).—Quain does not speak of *aortic lymphatic glands* and *plexus*, but divides the *lumbar glands* into three groups, two *lateral* and one *median*, which correspond roughly with the *lumbar* and *aortic glands* respectively of Toldt. Macalister's terminology, however, resembles that of the German author, for according to the former (*op. cit.*, p. 432) the *lumbar lymphatic plexuses* "are

united across the aorta by a median *aortic lymphatic plexus*, with about six glands in its course."

<sup>315</sup> *Submaxillary and Suprahoid or Submental Lymphatic Glands* (Fig. 1115, p. 720).—"The lymphatic glands situate along the lower border of the inferior maxillary bone and on the surface of the submaxillary (salivary) gland, known as *lymphoglandulae submaxillares*, receive the lymphatic vessels from the face that run beside the facial vein, and also those from the lower gums, the floor of the mouth, and the isthmus of the fauces. One or two glands, situate between the anterior bellies of the digastric muscles, and known as *lymphoglandulae submentales*, receive the lymphatic vessels of the chin" (Von Langer and Toldt, *op. cit.*, p. 566). The last-named are apparently identical with those called by Sappey the *suprahoid glands*, one or two small glands "placed in the centre of the neck between the anterior bellies of the two digastric muscles, and connected with the lymphatics descending from the lower lip" (Quain, *op. cit.*, vol. ii., part ii., p. 558).

<sup>316</sup> (Fig. 1116, p. 721.) As the author recognises *two* mediastina only, *anterior* and *posterior* (see Appendix to Part IV., note <sup>24</sup>), the lymphatic glands called by him *lymphoglandulae mediastinales anteriores* comprise the *superior mediastinal* or *cervical lymphatic glands* in addition to the *anterior mediastinal lymphatic glands* of English authors: see also note <sup>2</sup> to p. 482, in Part IV.

<sup>317</sup> *Anterior Auricular and Parotid Lymphatic Glands* (Ibid.) Writing of the *parotid lymphatic glands*, Quain states (*op. cit.*, vol. ii., part ii., p. 558) that they are "three or four, of small size . . . beneath the parotid fascia, and . . . frequently more or less embedded in the substance of the parotid gland; one, larger than the others, is situated immediately in front of the tragus of the ear." It is thus evident that the glands called by Toldt *lymphoglandulae auriculares anteriores* are included by Quain among the *parotid lymphatic glands*.



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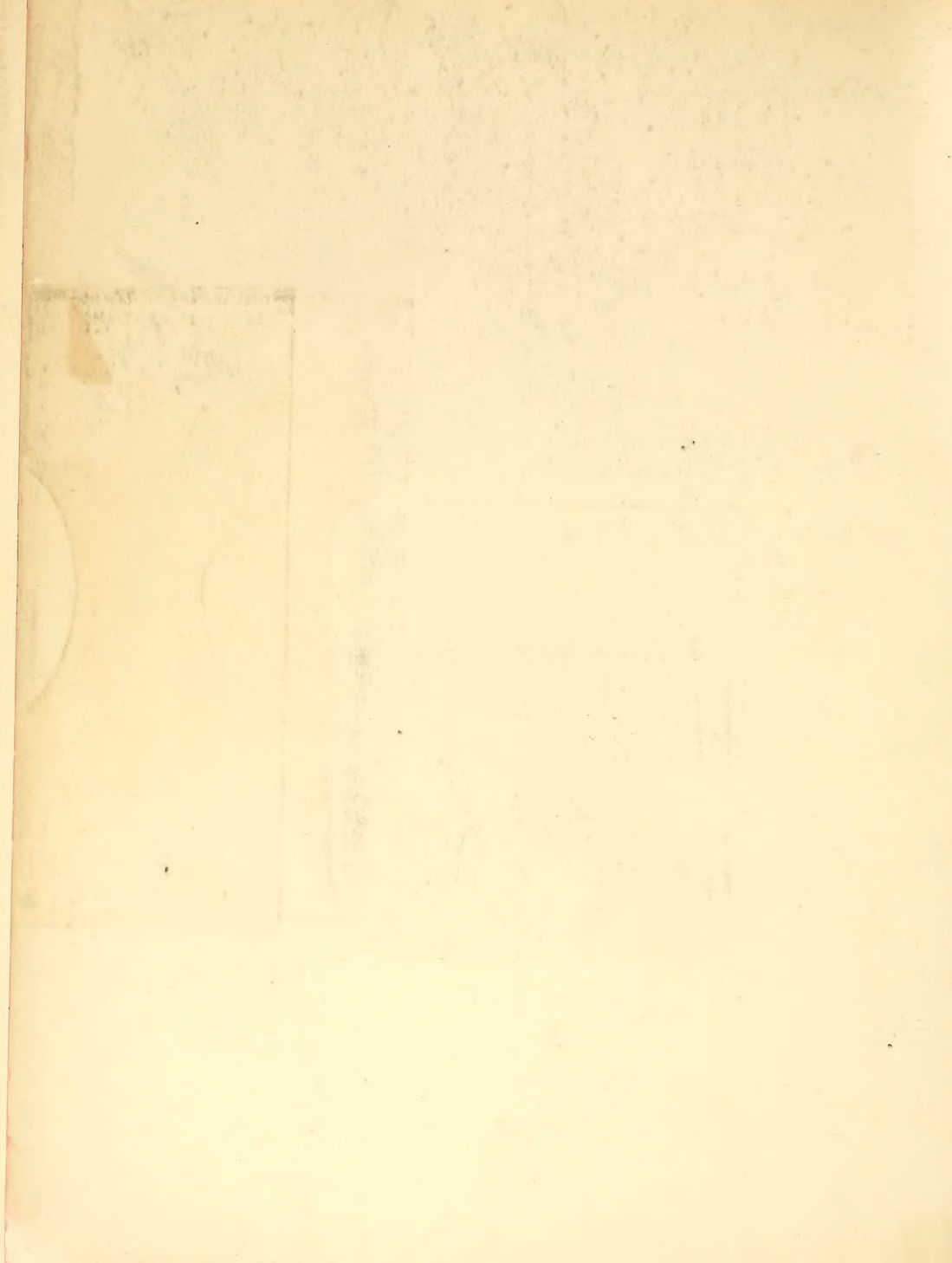
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